

THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York.

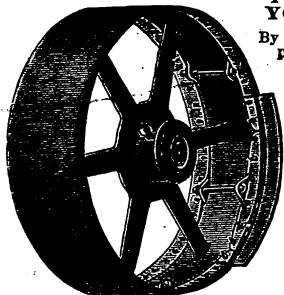
Vol. LII: No. 7.

New York, Thursday, August 17, 1893.

\$4.50 a Year, including Postage.
Single Copies, Ten Cents.

Reading Matter Contents.....page 328
Classified List of Advertisers..... 103
Alphabetical Index to Advertisers " 107
Advertising and Subscription Rates " 335

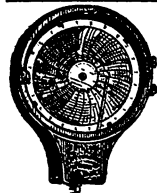
SAVE YOUR POWER,
YOUR BELTS,
YOUR MONEY



By covering your
pulleys with
**SHULTZ
Patent
Leather
Pulley
Covering**
Send for Circular I
to
**SHULTZ BELTING
CO.,**

ST. LOUIS, MO.
NEW YORK, N. Y., 225 Pearl St., A. B. Laurence, Mgr.
BOSTON, MASS., 164 Summer St., G. J. Kelley, Mgr.
PHILADELPHIA, PA., 129 N. 3d St., J. Garnett, Mgr.

TUDOR IRON WORKS,
ST. LOUIS
Manufacturers of
BOAT SPIKES.



Every Steam Plant
Should be provided with
**BRISTOL'S RECORDING
PRESSURE GAUGE.**
Low in Price and Guaranteed.
Send for circulars and fac-simile
chart.
THE BRISTOLS' MFG. CO.
Waterbury, Conn.



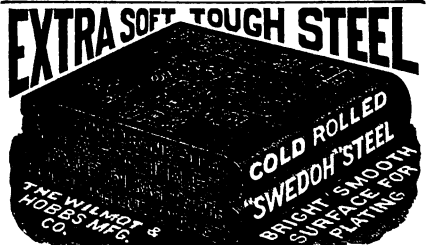
**SOLID BRAIDED
CORDAGE.**

All Kinds. Sizes and Colors.
SEND FOR SAMPLES.
Samson Cordage Works,
BOSTON, MASS.

TURNBUCKLES.



BRANCH OFFICE: **Cleveland**
136 Liberty St., City Forge and Iron Co.,
NEW YORK. **CLEVELAND, O.**



BRIDGEPORT, CONN. SEE PAGE 3.
THE WILMOT & HOBBS MFG. CO.



Manufacturers of Al. Nickel Finish Standard
Wrought Gongs Capacity 50,000 Bells per day.
Orders filled promptly from stock Also unexcelled
18 Karat **BRONZED BELLS.** A cheap and
elegant finish. Mills and Factories, Bridgeport, Conn.
Store, 20 Murray Street, New York.

QR. MR. GENERAL'S OFFICE

Rec'd

Section



HIGHEST GRADE PAPER SHELLS.

METAL

LINED

GREEN

PAPER.



BATTERY

CAP.

DEEP

STRONG

PRIMER.

The increased demand for high grade shells will completely obviate the
annoyance of occasional hang-fires incident to the use of Nitro Powders in low
grade Shells has induced us to make a substantial reduction in the price of our
Celebrated "**TRAP**" Paper Shells.

The Union Metallic Cartridge Co.,
BRIDGEPORT, CONN.

RANDOLPH & CLOWES,

WATERBURY, - CONN.

Western Depot, 71 West Washington St., Chicago, Ill.

Branch Offices: 104 John St., New York.
333 Walnut St., Philadelphia, Pa.
21 Milk St., Boston, Mass.
Room 208 Neave Building, Cincinnati, O.

SEAMLESS DRAWN BRASS AND COPPER TUBING.
Hot and Cold Rolled Sheet Copper and Brass of all kinds.



TO THOSE INTERESTED IN OR USING VALVES.

We have recently made improvements in the manufacture of **JENKINS
BROS.' VALVES** having increased the number of bolts, thickness of flanges, &c.
We shall manufacture *one grade of valve only*, suitable for high or low
pressure steam. The Jenkins Discs used in these valves are suitable for high
or low pressure. We guarantee all valves stamped with Trade-Mark.

JENKINS BROS.,
NEW YORK. PHILADELPHIA. BOSTON and CHICAGO.

DRIPPING PANS. 40 Sizes. The best made. (Beaman's Patent Improved.)

MARYLAND ROASTER AND BAKER. { New and Effective.
Cheapest in the Market.

Made only by **MATTHAI, INGRAM & CO.,**
Factory and Main Office: BALTIMORE, MD. Branch: 42 Cliff St., N. Y.
Leading manufacturers of Stamped and Patent Pieced Tin Ware and Galvanized
Iron Ware.

THE WILLIAMS PRINTING CO.,
Commercial Printers AND Binders.
ESTIMATES FURNISHED FOR ALL CLASSES OF WORK.

96, 98, 100 and 102 READE STREET, - NEW YORK.

Rainey Connellsville **Coke.**
Furnace and Foundry

The only Coke you can buy and know you are getting the best that can be manufactured. All our works is
the heart of the Region, within four miles of Connellsville, Pa.

CAPACITY, 3,000 TONS DAILY.

W. J. RAINEY, MAIN OFFICE: **CLEVELAND, OHIO.**
Mercantile Bank Building.

THE
ANSONIA BRASS
AND **COPPER CO.**
MANUFACTURERS OF
BRASS AND COPPER
Seamless Tubes, Sheets, Rods and Wire.

Ingot Copper.

SOLE MANUFACTURERS

Tobin Bronze

(TRADE-MARK.)

Condenser Plates, Pump Linings, Wire, Round,
Square and Hexagon Bars, for Pump
Piston Rods and Bolt Forgings.

19 & 21 Cliff Street, - - New York.

THE
New Haven Copper Co.,
SOLE MAKERS OF

POLISHED COPPER

Under Patent of T. James, Sept. 12, 1876.

ALSO MANUFACTURERS AND
DEALERS IN

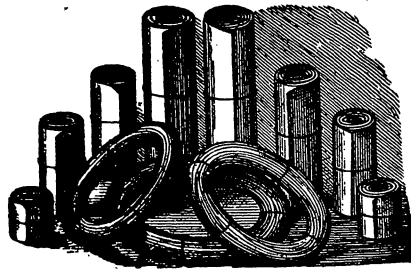
BRAZIERS' & SHEATHING COPPER,

Kettles, Bottoms, Bolts, Circles, &c.,

ALSO MANUFACTURERS OF

Cast Steel Augers and Bits of Superior Quality.

294 Pearl St., NEW YORK.



Waterbury Brass Co.

Established 1845.

Sheet, Roll and Platers' Brass,

German Silver, Copper, Brass and Ger-
man Silver Wire, Brass and
Copper Tubing,

**COPPER RIVETS AND BURS
PERCUSSION CAPS,
TAPE MEASURES,
METALLIC EYELETS,**

Brass Kettles, Brass Tags, Powder Flasks,
Shot Pouches, &c.,
AND SMALL BRASS WARES OF EVERY DESCRIPTION.
HICK'S PRIMERS. BERDAN PRIMERS.

*Cartridge Metal in Sheets or
Shells a Specialty.*

Sole Agents for the CAPEWELL MFG. CO.'S
Line of Sporting Goods.

DEPOTS:

296 Broadway, New York. 125 Eddy St., Prov-
dence, R. I.

MILLS AT WATERBURY, CONN.

JOHN DAVOL & SONS,

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

INGOT COPPER, SPELTER, LEAD, TIN,
ANTIMONY, SOLDER & OLD METALS,
100 John Street, - New York.

Iron and Steel. The Journal of the Iron and Steel
Institute. No. 2, 1892. 584 pages, with 27 plates.
\$6.00

For Sale by DAVID WILLIAMS, 96-102 Reade St., N. Y.

Varnishes, Lacquers, Printing Inks and Sealing-Waxes:

THEIR RAW MATERIALS AND THEIR MANUFACTURE,

To which is added the Art of Varnishing and Lacquering, including the Preparation of Putties and of Stains
for Wood, Ivory, Bone, Horn and Leather.

By WILLIAM T. BRANNT.

ILLUSTRATED BY THIRTY-NINE ENGRAVINGS. 338 PAGES, CLOTH, \$3.00.

Sent, postpaid, on receipt of price by DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.

MATTHIESSEN & HEGELER ZINC CO.,

LA SALLE, ILLINOIS,

SMELTERS OF SPELTER.

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc out to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

BRASS GOODS MFG. CO.,

Mfrs. of Stamped Brass, Silver and Nickeled Goods, Brass Labels for Cans and Rubber Moulds,

BRONZE DOOR KNOBS

Bronze and Plated Roses, Combined Rose and Escutcheon Plates, Socket Shells, &c., Patent Mirror Pin
Cushion Business Cards, Mucilage Brushes. Novelties of new design made to order.

SALESROOM: 88 Chambers St., New York. FACTORY: 86-92 Third St., So. Brooklyn.

HENDRICKS BROTHERS,

Proprietors of the

Belleville Copper Rolling Mills,

Manufacturers of

Braziers', Bolt and Sheathing

COPPER.

COPPER WIRE AND RIVETS.

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc.
49 CLIFF ST., NEW YORK.

THE PLUME & ATWOOD MFG. CO.

MANUFACTURERS OF

Sheet and Roll Brass

—AND—

WIRE,

GERMAN SILVER AND GILDING METAL,
COPPER RIVETS AND BURRS, COP-
PER ELECTRICAL WIRE,

Pins, Brass Butt Hinges, Jack Chain,
Kerosene Burners, Lamp
Trimnings, &c.

18 MURRAY ST., NEW YORK.

71 PEARL ST., BOSTON.

90 MARKET ST., CHICAGO.

ROLLING MILL,
THOMASTON, CONN.

FACTORIES:
WATERBURY, CONN.

Holmes, Booth & Haydens

MANUFACTURERS OF

**Sheet, Roll Brass, Brass and
German Silver Wire.**

COPPER RIVETS AND BURRS

JACK CHAIN.

SEAMLESS TUBING, BRASS AND COPPER.

Brazed Brass and Copper Tubing,
Bare and Insulated Wire for Elec-
tric Lighting and Street Rail-
way Use, Lamp Goods and
Kerosene Burners in
great variety.

FACTORIES: 25 Park Place,
Waterbury, Conn. New York.

SCOVILL MFG. COMPANY,

Manufacturers of

BRASS

Sheet, Wire, Tubes.

**BUTT HINGES,
BUTTONS,
LAMP GOODS,
NOVELTIES.
PURE ALUMINUM**

INGOT and SHEETS.

FACTORIES, WATERBURY, CONN.

DEPOTS:

438 Broome Street, New York.
210 Lake Street, Chicago.
29 High Street, Boston.

WILLIAM S. FEARING.

100 Chambers St., NEW YORK,

SELLS TO THE TRADE

*Sheet Brass, Fancy Sheet Brass,
German Silver, Copper, Brass
and German Silver Wire,
Brazed and Seamless Brass and
Copper Tubes, Brass and Cop-
per Rods, Brass Ferrules,
Pure Copper Wire,
Sheet and Ingot Copper, Spelter,
Tin, Antimony, Lead, &c.*

Rough Casting of Aluminum.

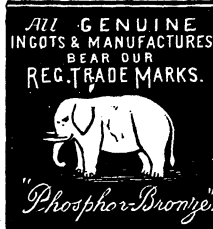
Aluminum Bronze, German Silver Bronze and all
kinds of Metals. Manufacturers of Chandeliers, Metal
Picture Frames, Ink Stands, Figures, Statues, etc.
Stair Carpet Holders a Specialty.

St. Louis Bronze & Aluminum Works,

3741-3743 North Broadway,

ST. LOUIS, MO.

**ELEPHANT
TRADE-MARK.**



PHOSPHOR-BRONZE
INGOTS, CASTINGS, WIRE, SHEET &C.
THE PHOSPHOR BRONZE SMELTING CO. LIMITED
512 ARCH ST. PHILADELPHIA PA. U.S.A.
ORIGINAL MANUFACTURERS OF PHOSPHOR-BRONZE IN THE UNITED STATES AND SOLE MAKERS OF "ELEPHANT BRAND" PHOSPHOR-BRONZE.

**PHOSPHOR
BRONZE.**

The Wm. Cramp & Sons S. & E. B. Co., PHILADELPHIA, PENNA.

BRASS FOUNDERS.

YORK AND THOMPSON STS.,
SOLE MANUFACTURERS OF

AMERICAN MANGANESE BRONZE.



MANGANESE BRONZE PROPELLER WHEELS A SPECIALTY.

Our Manganese Bronze is invaluable where Castings of great Tensile Strength are needed. In this quality it is nearer Steel than any other alloy in the market, and in appearance the castings are unequaled.

We Make Larger Castings and More of Them than Any Competitor.

**GENUINE
PHOSPHOR TIN,**

MANUFACTURED BY THE

CROSBY STEAM GAUGE AND VALVE CO.

Boston, Mass., U. S. A.

Branches: NEW YORK, CHICAGO AND LONDON.

PASSART CASTING CO.

Passart, N.J.
New York Office
33 N. ARDEN St.
Fine Castings by new pressure process, equal to hand cut work, in Bronze, Brass, Aluminum and German Silver. Machinery Name Plates, Aluminum Bronze Dies, Intricate Mechanical Castings, etc.

FINEST ALUMINUM CASTINGS.

THE CRESCENT TRY IT!
AND YOU WILL USE NO OTHER
**THE CRESCENT BRAND
PHOSPHOR
TIN.**
THE HIGHEST AND
RICHEST GRADE MADE.
MANUFACTURED ONLY BY
THE CRESCENT PHOSPHORIZED METAL CO.
OFFICE AND WORKS
2107 2109 and 2111 INDIANA AV. PHILADELPHIA, PA.

THE CELEBRATED ACID RESISTING DEOXIDIZED BRONZE
IN INGOTS OR CASTINGS, AND
DEOXIDIZED BABBITT METALS.
BEST IN THE WORLD.
Large Castings a Specialty.
Bridgeport Deoxidized Bronze and Metal Co.,
BRIDGEPORT, CONN.

**BRASS, BRONZE,
COMPOSITION and
ALUMINUM
CASTINGS, Heavy and Light.**

F. L. GAYLORD CO.

ANSONIA,
CONN.

Send
for
Prices.

CROWN SMELTING COMPANY,
Chester, Pa.
Bronze, Brass and Composition Castings.

Inventors and Sole Manufacturers of

"Crown Bronze" Bearing Metal and "Crown ROLLING MILL Babbitt Metal."

Manufacturers of **PHOSPHOR-BRONZE TO PENNSYLVANIA RAILROAD.**
Specifications in ingot metal or castings.

THE WILMOT & HOBBS MFG. COMPANY

Especially solicit orders for "Soft" and "Extra Soft"
Plain Blue Finish or Annealed or Pickled

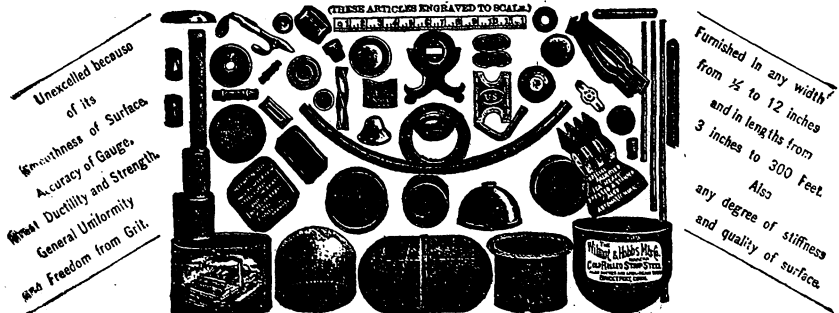
**HOT ROLLED BAND, STRIP
AND PLATE STEEL.**

Great accuracy of gauge and width and uniformity of
quality will always be maintained.

Also THE CELEBRATED BRIGHT SURFACE and ANNEALED

COLD ROLLED SHEET AND STRIP STEEL

FOR DIFFICULT PRESSED, STAMPED, DRAWN WORK, &c.



The above illustrates something of the variety of Stamped and Drawn Work which can be made from this Steel.

PRICES GREATLY REDUCED On some Grades and Sizes of C. R. Steel when Bought in Large Quantities of a Size.
When in a hurry use Long Distance Telephone.
The Iron Age Steel Co. Dept. B. 7. City, Pa. N. Y. & C. & A.

BRIDGEPORT, CONN.

PHOSPHOR-TIN

BY USING MY PHOSPHOR TIN MANUFACTURERS CAN MAKE ANY DESIRED GRADE OF PHOSPHOR BRONZE THEMSELVES BY THE SIMPLE PROCESS OF MELTING. MUCH CHEAPER THAN THEY ARE NOW TO BE HAD IN THE MARKET. NEW OR OLD COPPER CAN BE USED. FOR CIRCULARS AND PRICE ADDRESS **HALK & NAUMANN** NEW-YORK OFFICE SOLE AGENTS FOR THE U.S. AND CANADA. PEARL

WIRE

NAILS.

INDIANA WIRE FENCE CO.,

Crawfordsville, Ind.

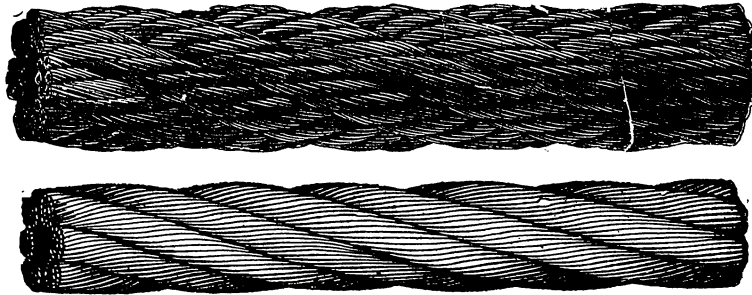
Washburn & Moen Manuf'g Co.,

WORCESTER, MASS., NEW YORK CITY, CHICAGO.

MAKERS OF IRON, STEEL AND COPPER

EVERY VARIETY OF **WIRE** FOR ALL PURPOSES.
WIRE ROPE AND CABLE.

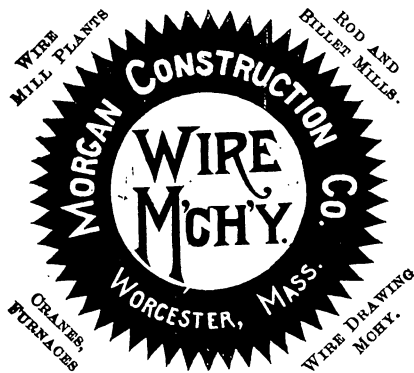
Hard and Soft Drawn Copper Wire for Electrical Purposes; Galvanized Iron and Steel Telegraph and Telephone Wire, Glidden Patent Steel Barb Wire; Watch and Clock Main Springs; Eyeglass Springs; Steel Wire for Needles and Drills; Patent Steel Wire Bale Ties; Pump Chain; Two Strand Twisted and Flat Twisted Fence Wire without Barbs; Fence Staples, Stretchers, &c.; Bright, Annealed, Tinned and Galvanized and Copper Wire, on Spools 1 oz. to 1 lb



Galvanized Iron Wire Rope for Ships' Rigging, &c. Galvanized Steel Wire Cables for Suspension Bridges, Transmission and Standing Ropes, Hoisting Ropes, Tiller Ropes, Switch Ropes, Copper, Iron and Tinned Sash Cord, Phosphor Bronze and Copper Wire Rope, Wire Clothes Lines, Picture Cord, Galvanized Wire Seizing, and all the Fixtures and Appliances required for use with the foregoing. The famous yachts Mayflower, Volunteer and Sachem are all rigged with our Wire Rope.

SEND FOR PRICE-LISTS, CIRCULARS AND DESCRIPTIVE PAMPHLETS.

New York Warehouses, 16 Cliff St., and 241 Pearl St. Chicago Warehouse, 107 & 109 Lake St. San Francisco Warehouse, 8 & 10 Pine St.



The American Metal Co.

(LIMITED),

Levin Building, 80 Wall St., New York.

P. O. BOX 957.

COPPER, COPPER ORES AND MATTES.

TIN, LEAD, SPelter, ANTIMONY, NICKEL, ALUMINUM, BULLION, IRON.

Advances made on Consignments.

AGENTS FOR

Henry R. Merton & Co., - - London.
Metallgesellschaft, Frankfurt-on-Main.
Williams, Foster & Co., Ltd., Swansea.

AMERICAN SPIRAL SPRING CO.

MANUFACTURERS OF

ALL KINDS OF SPIRAL SPRINGS.

OFFICE AND WORKS:

Shingiss and Bluff Streets, - PITTSBURGH, PA.
TELEPHONE 705.

WM. MCFARLAND,
IRON FOUNDER,

TRENTON, - - N. J

Chilled Cast Wire DIES

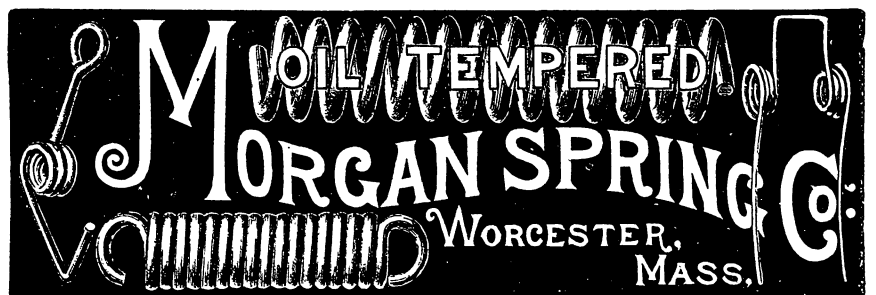
A SPECIALTY.

Any Size or Style Made at Short Notice.



Guaranteed Best Anti-Friction Metal for all machinery bearings. For high speed and heavy crushing weight it has no equal. Introduced in this country since 1891 and has displaced all Anti-Friction metals it has come in contact with.

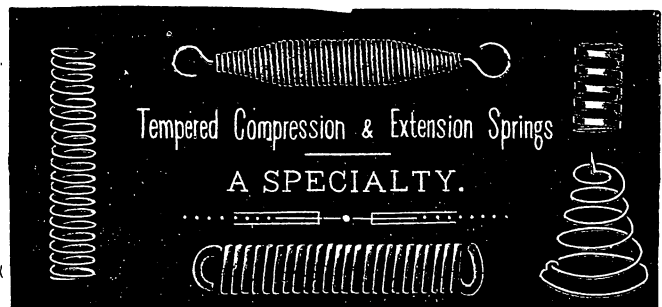
THEODORE HIERTZ & SON, SOLE MFRS..
Manufacturers Babbitt Metals, Solder, Lead Seals, &c.
30th St., & Park Ave., St. Louis, Mo.



MILLER & VAN WINKLE,
MANUFACTURERS OF

STEEL WIRE AND STEEL SPRINGS.

TEMPERED STEEL WIRE.



MACHINERY SPRINGS.

OFFICE AND WORKS: }
18 to 24 Bridge Street, } BROOKLYN, N. Y.

VOLUTE,
WIRE
and
FLAT STEEL

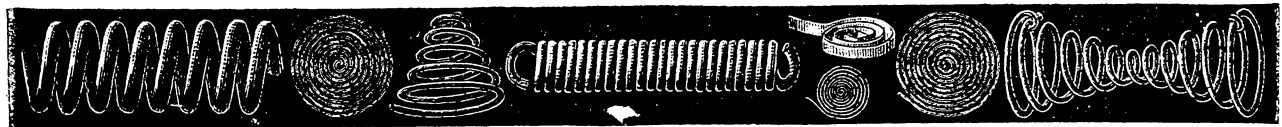
SPRINGS

& Agricultural Implements, Machinery and various other purposes.
Write for prices to
SABIN MACHINE CO.,
MANUFACTURERS,
MONTPELIER, VT



117th to 118th Street and Harlem River.

General Offices, Foot 118th Street, New York.



Makers of Iron, Bessemer, Siemens-Martin and Crucible Cast Steel Wire of all kinds, annealed, soft and hard drawn; Coppered Spring Wire for Furniture Springs, &c., Coppered Soft Wires, Baling Wires, Suspension Bridge and Rope Wires of all kinds, &c.

STEEL MUSIC WIRES and MUSIC SPRING WIRES,

UNRIVALED FOR PIANOFORTE STRINGS.

FOR THE HIGHEST CLASS OF SPRINGS.

Specialty of finest Cast Steel Wires, Round, flat, square and any other shape, tempered and also in the soft state, guaranteed to harden and temper. Solid Rib and Paragon Umbrella Wires. Crinoline, Corset, Shade Roller, Lock, Hat, Brush, Saw, Band Saw, Clock Spring, Clock Bell, Clock Verge and Watch Spring, Rule and Tape Line and Eyeglass Wires, &c. Piano, Needle, Fish Hook, Drill and Hair Spring Wires. Special Cast Steel Wires of any kind made for special purposes. Also Covered Wires—Braided and Cloth and Paper Covered—for crinoline, corset and other purposes. Cold Rolled and Slit soft and Tempered Steel Strips of all kinds and for all purposes.

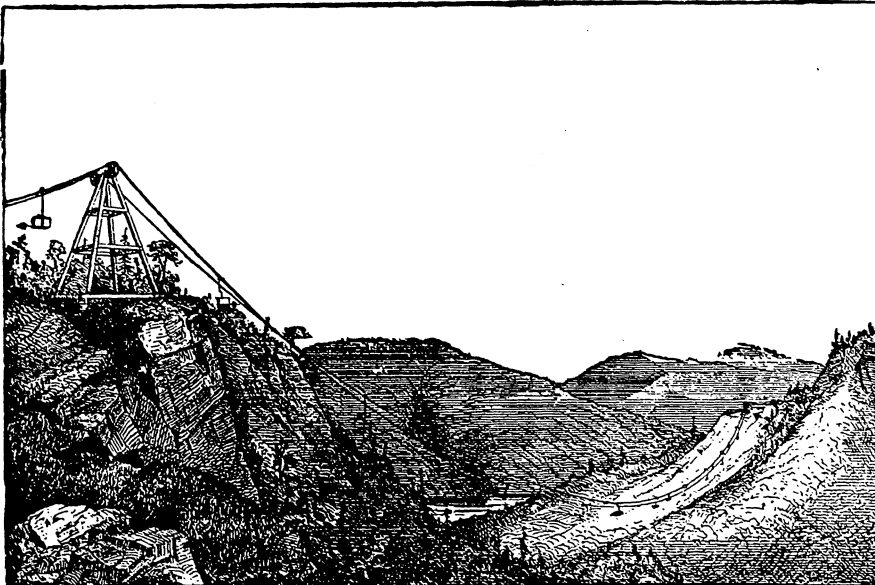
Special Wires and Springs of Every Description.

CORRESPONDENCE SOLICITED.

SAMPLES FURNISHED ON APPLICATION.

CALIFORNIA WIRE WORKS,

9 FREMONT STREET, SAN FRANCISCO, CAL.



Manufacturers of Wire Rope for Cable Railways and Mining Purposes.

HALLIDIE'S PATENT WIRE ROPEWAY

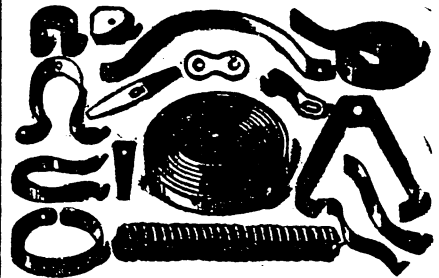
Simplest and most economical means of transportation. Send for Illustrated Catalogue.

THE CELEBRATED "SILVER FINISH"

GALVANIZED POULTRY NETTINGS.

FOR SALE BY THE HARDWARE TRADE.

GET THE BEST



DUNBAR BROS.,

Manufacturers of

Clock Springs and Small Springs

of every description, from best Cast Steel,

BRISTOL, CONN.

FRED NOURSE CO.,



STEEL WIRE AND STEEL SPRINGS,

315, 317 and 319 East 22d St., New York.

MANUFACTURER OF ALL KINDS OF REGISTER SPRINGS A SPECIALTY FOR STEEL SPRINGS ELECTRICAL INSTRUMENTS

ALANSON CARY

240 & 242 W. 29TH ST. NEW-YORK

**Always
Ask
For**



**Unequaled for Strength
and Durability.**

Made Only by

**Broderick & Bascom Rope Co.,
St. Louis, Mo.**

**HOWSON
AND
HOWSON**

**Counsellors at Law
Solicitors of Patents**

PHILADELPHIA
Forrest Building, 119 S. 4th St.
NEW YORK
Potter Building, 38 Park Row.
WASHINGTON
Atlantic Building, 928 F St.

PATENTS

U. S. and Foreign Secured.

Trade Marks and Copy Rights. Twenty Years' Experience. Send model or sketch and brief description of your invention for **Free** report as to patentability. Expert searches and opinions as to Scope, Validity and Infringement. Patent Causes Prosecuted and Defended. Practice in U. S. Supreme, Circuit and Circuit Appeals Courts, and U. S. Patent Office.

Send for "Plain Words about Patents," Free.

PATENT PRACTICE EXCLUSIVELY. References Furnished on Application.

E. B. STOCKING, Attorney at Law,
611 F ST., N. W., WASHINGTON, D. C.

PATENTS

\$40,000,000

Earned by Bell Telephone Patent in 1891. Protect your invention by **PATENT.** No charge for examination to determine patentability. Send model and description. **NEW BOOK FREE.**
S. C. FITZGERALD, Washington, D. C.

PATENTS.

H. W. T. JENNER, Patent Attorney and Mechanical Expert. 519 Seventh St., Washington, D.C. Charges moderate. Write for terms. Established 1883.

F. H. ARNOLD,
Designer

ARTISTIC METAL WORK,
New Britain, Conn.

SPRINGS—RIVETS.

Specialties in

**SHEET METAL WORK,
CLOCK and INDICATOR POINTERS,**
CLARK & COWLES, Plainville, Ct.

PHILLIPS, TOWNSEND & CO.,
North Penn Junction, Philadelphia.

**WIRE NAILS, - - -
- - NORWAY RIVETS.**

Rivets marked "P" are not of our make. We make only **first-class NORWAY IRON RIVETS**

A. LESCHEN & SONS' ROPE CO.,
MANUFACTURERS OF



ST. LOUIS, MO.

CORRESPONDENCE INVITED.



Williamsport Wire Rope Co., Williamsport, Pa.

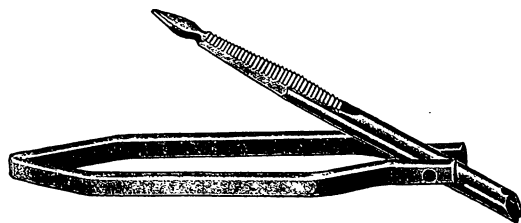


WAREHOUSES: 87 Liberty St., New York.

WORKS

Wilkesbarre, Pa.

SHOW GOODS



Improved.

Finger Nail Cutters

McDonald's patent.

**DO
THE
WORK.**

Tempered. Nickel Plated.
THE WIRE GOODS CO., Worcester, Mass.
Manufacturers.

NEW HAVEN WIRE MFG. CO.,

Manufacturers of

WIRE

in great variety.

NEW HAVEN.

CONN.

Wire Cloth AND Wire Goods

Hardware Grade and
Fanning Mill Wire Cloth,
Poultry Netting, Heavy
Window Screen Wire
Cloth, Coal and Sand
Screens, Riddles, Ash
Sieves, &c., &c.



Office and Counter
Railings, Elevator En-
losures, Wire Stall
Guards, Hay Racks
Feed Boxes, Window
Guards, &c., &c.

BUFFALO, N. Y.

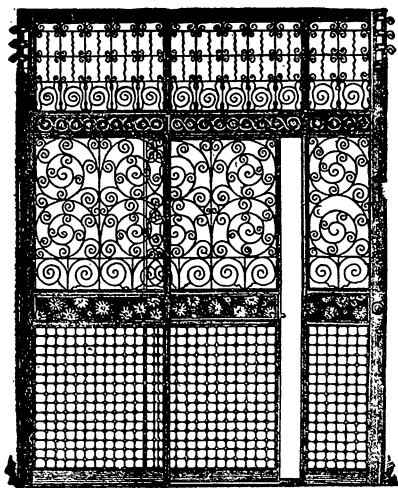
BOOKS

THE NEWEST BOOKS ON Metal Working, Iron, Steel and Metallurgy; Mining, Mechanical and Civil Engineering; Casting and Founding; Electricity and Electric Lighting; Draftsmanship, Architecture and Building, promptly supplied on receipt of price. **SEND FOR CATALOGUES,** mentioning the kind of books you are looking for.

DAVID WILLIAMS, 96-102 Reade St., New York.

HOWARD & MORSE
45 FULTON ST.,
NEW YORK.
HEAVY MINING
COPPER,
BRASS,
STEEL
OR IRON
WIRE CLOTH.

ALSO
MANUFACTURERS OF
GENERAL
WIRE WORK.
 Window Guards,
 Stable Fixtures,
 RAILINGS,
 Sand Screens
 Coal Screens
 Etc.



Elevator Enclosures.

Brass Wire and Iron Railings in plain or fancy designs.

Wire and Wrought Iron Fences and Window Guards.

WRITE FOR CATALOGUE.

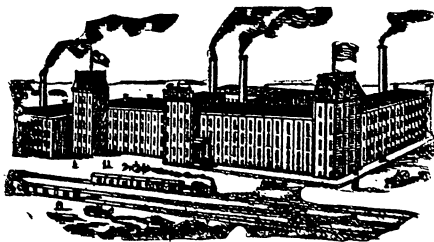
LUDLOW-SAYLOR WIRE CO.,

114 & 116 South 4th St., St. Louis, Mo.

WICKWIRE BROTHERS, CORTLAND, N. Y.

MANUFACTURERS OF

Wire Cloth and Wire Goods,



Coal Sieves,
 Flour Sieves,
 Corn Poppers,
 Dish Covers,
 Metallic
 Coal Sieves.

NEW PROCESS
Cortland
POWER LOOM
WIRE CLOTH.

Every roll wrapped in Pink Paper and has our name on label.

Kilmer Manufacturing Co.

—Newburgh, N. Y.

Manufacturers of

BALE TIES

For Baling
 Hay, Straw,
 Rags,
 Excelsior, &c.

Also Wire Rods, Barb Wire, Coiled Steel Wire, Wire Staples, Galvd. Wire, Ornamental Fencing, &c., &c.

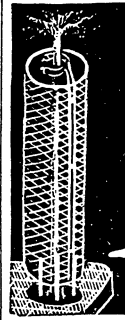
Western Warehouse, 543 and 545 State Street, Chicago, Ill.

Western Office, 21 Quincy Street, Chicago, Ill.

New York Office, 111 Water Street, New York City.

Works and General Office, Newburgh, N. Y.

Tree Protector.



McCallips' Pat.

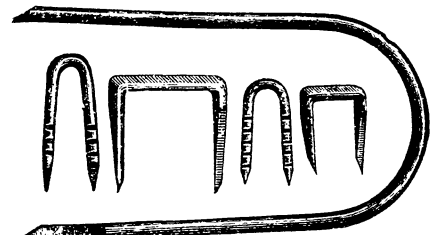
The Best Tree Guard on the Market. Price \$12 per doz. Discount to the Trade.

Iron Fences, Wire Fences and Builders' Wire Work.

McCallip Fence & Wire Works,
 485 Oak Street,
 COLUMBUS, - OHIO.

E. H. Titchener & Co.,
 BINGHAMTON, N. Y.

—MANUFACTURERS OF—



STAPLES in All Varieties,
 Double-Pointed Tacks, Bed Links, Etc.

Blind Staples a Specialty:

COBB & DREW,

PLYMOUTH, MASS.

Manufacturers of Norway Iron Rivets, Brass and Copper Rivets, Burrs, Washers, D. P. Tacks and Staples.

New York Agency, James S. Henderson, successor to Disosway & Henderson, Hardware.

Agents for Philadelphia Star Carriage and Tire Bolts.

Architectural Iron and Steel and Its Application in the Construction of Buildings.

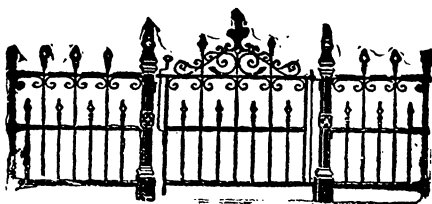
Fully Illustrated with Engravings from Original Designs.

GENERAL CONTENTS:

Chapter I. THE MANUFACTURE OF IRON AND STEEL. Articles 1 to 24.
 Chapter II. FLOORS. Articles 25 to 51.
 Chapter III. GIRDERS. Articles 52 to 66.
 Chapter IV. CAST IRON LINTELS. Articles 67 to 76.
 Chapter V. TRUSSES. Articles 77 to 90.
 Chapter VI. STRUTS. Articles 91 to 101.
 Chapter VII. CAST IRON COLUMNS. Articles 102 to 118.
 Chapter VIII. WROUGHT IRON COLUMNS. Articles 119 to 124.
 Chapter IX. STAIRWAYS. Articles 125 to 139.
 Chapter X. ORNAMENTAL IRON. Articles 140 to 146.
 Chapter XI. ELEVATOR ENCLOSURES. Articles 147 to 150.
 Chapter XII. DOORS AND SHUTTERS. Articles 151 to 160.
 Chapter XIII. FLOOR LIGHTS AND SKYLIGHTS. Articles 161 to 165.
 Chapter XIV. HOLLOW BURNT CLAY. Articles 166 to 167.
 Chapter XV. ANCHORS. Articles 168 to 177.
 Chapter XVI. BOLTS. Articles 178 to 188.
 Chapter XVII. PRACTICAL DETAILS ILLUSTRATED. Articles 189 to 239.
 Chapter XVIII. FINISHING IRON. Articles 240 to 246.
 Chapter XIX. SPECIFICATIONS.
 Chapter XX. TABLES.
 Chapter XXI. SELECTED PAPERS ON IRON WORK, FROM THE NEW YORK BUILDING LAW, 1891.

By WILLIAM H. BIRKMIER,
3vo Cloth, - - - \$3.50.

SENT POST-PAID BY
DAVID WILLIAMS, Publisher and Bookseller,
 96-102 Reade St., N. Y.

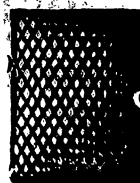


Reliance Wire & Iron Works, MILWAUKEE, WIS.

ARCHITECTURAL WIRE AND IRON WORKERS.

Wire Cloth, Galvanized Fencing and Netting, Wire Lath, Wire and Iron Fences and Railings, Window Guards, Stable Fixtures, Bank and Office Railings, all kinds of Brass, Wire and Iron Work for Buildings and Offices.

SEND FOR ILLUSTRATED CATALOGUE.



CLINTON WIRE CLOTH CO.,

Manufacturers of Every Description of

WIRE CLOTH, HEX. NETTINGS, WIRE LATH AND FENCING.

Perforated Metals. GALVANIZERS AND TINNERS OF **Wire Cloth and Nettings.**

Clinton "Standard" (Number 33 Wire) Painted Window Screen Wire Cloth.

FACTORY AND GENERAL OFFICE: CLINTON, MASS.

NEW YORK, 76 Beekman Street.

BOSTON, 199 Washington Street.

CHICAGO, 137 Lake Street

The Gilbert & Bennett Mfg. Co.

MANUFACTURE

WIRE CLOTH, NETTING,
Fencing, Gates, Fencing Tools,
Wire Goods, Wire Work

RAILINGS, WINDOW GUARDS.

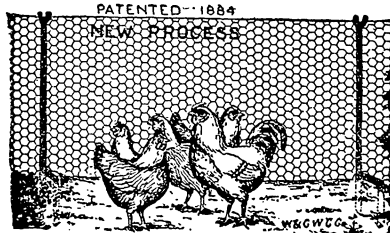
WIRE LATHING WITH HAMMOND'S METAL FURRING.

44 Cliff Street,
NEW YORK.
148 Lake Street,
CHICAGO.

Factories, { GEORGETOWN, CONN.
CHICAGO, ILLINOIS.
ESTABLISHED 1818.

Pearl Window Screen Wire Cloth.
Galvanized Steel Wire Cloth.
Galvanized Wire Poultry Netting.
"Cottage" Lawn & Garden Fencing.
The World's Web Wire Fencing.
Sieves, Riddles, Screens.
Gilbert's Rival Ash Sifters.
House Furnishing Wire Goods.

WRIGHT & COLTON WIRE CLOTH CO., Worcester, Mass.



HARD STEEL WIRE

NEW PROCESS
HARD STEEL WIRE CLOTH AND NETTING
GALVANIZED
WIRE NETTING.

Painted Window Screen Wire Cloth,

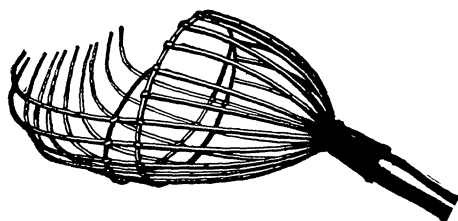
Patented March, 1884.

Patents Pending.

WIRE LATHING, HOUSE FURNISHING WIRE GOODS

SEND FOR LATEST CATALOGUE.

"PENNSYLVANIA" FRUIT PICKER.



This Cut almost speaks for itself—the device being so much like the human hand shows at once the utility of the article.

AS A FRUIT PICKER IT HAS NO SUPERIOR.

It is made of Heavy Galvanized Wire, and easily adjusted to a pole.

It has been sold for several years, and the demand (as it is becoming known) is steadily increasing.

The difficulty of detaching fruit and securing it unbruised is apparent to every one so engaged. This overcomes the difficulty, and saves the finest fruit, which commands the highest prices.

THE LOW PRICE AT WHICH IT IS SOLD

Brings it within the reach of those who have but little fruit to gather as well as those who have large quantities.

Price per dozen, \$6.00.

It will gather Apples, Peaches, Pears, Etc.

MANUFACTURED BY

PENNSYLVANIA WIRE WORKS,

EDWARD DARBY & SONS, - 233-235 Arch St., Phila., Pa.

PAINTED AND GALVANIZED WINDOW SCREEN CLOTH.

IRON, STEEL, BRASS AND COPPER WIRE CLOTH.

MANUFACTURERS
**THE ROEBLING
STANDARD
WIRE
LATHING.**

**NEW JERSEY
WIRE CLOTH CO.**

**"JERSEY"
POULTRY
NETTING
AND FARM
FENCING.**

TRENTON, 117 and 119 LIBERTY STREET,
NEW JERSEY. NEW YORK.

171 and 173 LAKE STREET,
CHICAGO.

25 and 27 FREMONT STREET,
SAN FRANCISCO.

FOUNDERS
IN BRASS AND COM-
POSITION, HEAVY
AND LIGHT CAST-
INGS.

P. P. EMORY MFG. CO.

— ESTABLISHED 1850. —

SPRINGFIELD, MASS.

Good Work, Fair Prices.

CORRESPONDENCE SOLICITED.



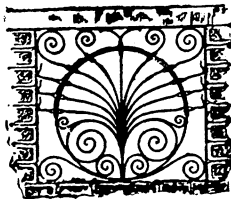
RESERVOIR VASES.

Lawn Furniture, Statuary, Office and Counter Railing, Wire Signs, Guards, Cresting, Columns, Iron Stairs, Balcony Railing, Stable Fixtures, Jail Cells, etc.

CATALOGUE FREE.

E. T. BARNUM, - DETROIT, MICH.

MENTION THIS PAPER.



THE VAN DORN IRON WORKS CO., Cleveland, Ohio.



Office and Salesroom, 157 1/2 Euclid Ave.,
MANUFACTURERS OF

WROUGHT IRON FENCE and RAILING.

Stable Fixtures, Crestings, Terminals, Wire Office and Counter Railing, Lawn Seats and Vases.

**Iron and Steel Jail Cell Work. Orna-
mental and Structural Ironwork.**

The Perfect Lawn Fence. Cheap as Wood.

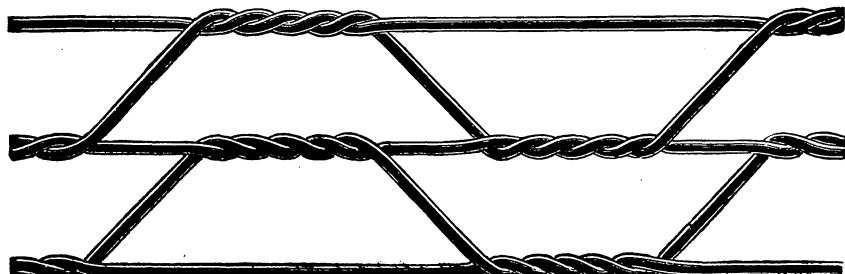


HARTMAN MFG. CO., - Works, Elwood City, Lawrence Co., Pa.

BRANCHES { 277 Broadway, New York.
73 S. Forsyth St., Atlanta Ga.
508 State St., Chicago, Ill.

WRITE FOR CATALOGUE AND PRICES.

STEEL WIRE FENCE BOARD.



STRONGEST AND CHEAPEST BARBLESS FARM FENCING.

Write for Circular of above, and Steel Web Picket Fence.

DEKALB FENCE CO., - DeKalb, Ill

AGENCIES: Eastern—HICKS & DICKEY, Philadelphia, Pa. Southern—W. R. BELKNAP & Co. Louisville, Ky. Western—WYETH HARDWARE & MFG. CO., St. Joseph, Mo. In Iowa and Michigan—INDIANA WIRE FENCE CO., Crawfordsville, Ind. Texas—G. K. MERIWETHER, Dallas

COPPERSMITHS,

and Manufacturers of

**COPPER AIR CHAMBERS,
EXPANSION PIPES**

AND COILS.

CHAMPION IRON CO.

SPECIALTIES.

Iron Stairs and Jail Work, Builders' and Ornamental Iron Work and the only manufacturers of Malleable Iron Cresting guaranteed against breakage; also manufacturers of the



Celebrated Ohio Champion Iron Force and Lift Pumps.

Send for 166-page Catalogue.

Largest Iron Fence and Railing Works in U. S.

KENTON. - OHIO.

W. S. ESTEY,

No. 65 FULTON ST., NEW YORK,

MANUFACTURER OF

WIRE CLOTH

Of Brass, Copper, Iron, Galvanized and Steel Wire of all meshes and grades. For Mining, Milling and all other purposes. Locomotive Spark Wire Cloth, &c.,

— AND —

WIRE WORK

For Banl., Office and Counter Railing, Store Fronts Window Guards, &c.

Galvanized Twist Netting.

Oliver's Patent Decoy Rat Traps.

S T Pat. Adjustable Foundry Riddles.

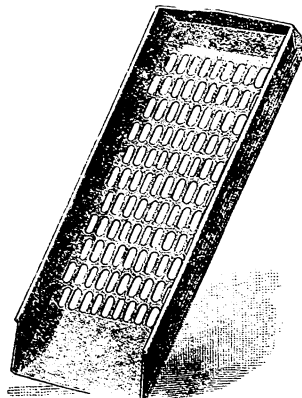
S T Sand Screens

SEND FOR CATALOGUE.

FLANGE STEEL SCREENS

OF PERFORATED METAL.

For SAND, GRAVEL, COAL and ORE.



**THE HENDRICK MFG. CO., LTD.,
CARBONDALE, PA.**

Corrugated, Crimped and Cap-Boat Iron Roofing & Siding.



Iron Buildings, Roofs, Doors, Shutters, Cornices Skylights, Bridges, &c.

MOSELEY IRON BRIDGE AND ROOF CO.,

Office, 5 Dey Street, Room 13, NEW YORK.

BORDEN & LOVELL,

**70 AND 71 WEST STREET.
NEW YORK.**

Steel, Iron and Wire Nails.



Mention The Iron Age,

PROTECT

Your Offices, Stores and Warehouses from fire and burglars by using

Metallic Doors and Shutters

Made from wood and covered with iron or steel, rendering them stiff and preventing warping in case of fire. Made from heavy boiler plate iron.

Made from double corrugated iron or steel.

Made to fit any size opening.

Estimates furnished upon application.

**GARRY IRON & STEEL ROOFING CO.,
CLEVELAND, OHIO.**

STEEL, IRON, COPPER, ZINC, BRASS AND TIN PERFORATED.

—FOR—
 Grain Cleaning Machinery;
 Woolen, Cotton, Paper Pulp, Rice,
 Flour and Oil Mills;
 Distilleries, Sugar and Malt Houses;
 Gas, Water, Brick and Tile Works, Filters, Ventilators, &c;
 Oil, Gas and Vapor Stoves, Lanterns, Lamps, etc.

Perforated Filter Press Plates
 For Paraffine Wax, Cotton-Seed Oil, Sugar and other purposes.



Screen Plates for Coal, Coke, and Ore Separators, Jigs, Trommels, Washers and Sizers.

Heavy Steel and Iron Plates and Cylinders for Coal and Coke Breakers, Ore, Stone, Phosphates & Gravel Screens.

For Railroads, Locomotive and Car Builders.

Prices and Samples on Application.

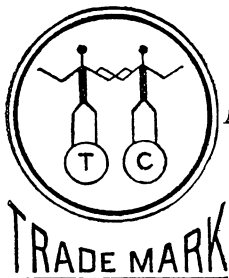
ALUMINUM or MANGANESE BRONZE
SCREEN PLATES
 TO WITHSTAND ACTION OF ACIDULATED WATERS
 WITH
 Hardness and Life of Best Steel.

THE HARRINGTON & KING PERF. CO.,
 Main Office & Works, 224 to 240 Union Street,
 Eastern office, No. 284 Pearl St., New York. **CHICAGO, ILL., U. S. A.**

THE MANNESMANN TUBE CO., LTD.,

LANDORE, South Wales, England,

Sole Manufacturers of the



Mannesmann Patent Weldless Steel Tubes

Rolled Direct from the Solid Bar. The only Tubes with a Spiral Fibre.

SPECIALTIES: Cold Drawn Steel Cycle and Boiler Tubes made of the finest Swedish Steel produced. Far superior to any others in the market. Best Quality Boiler Tubes (ordinary Finish). Hydraulic, Well Boring and Shell Tubes.

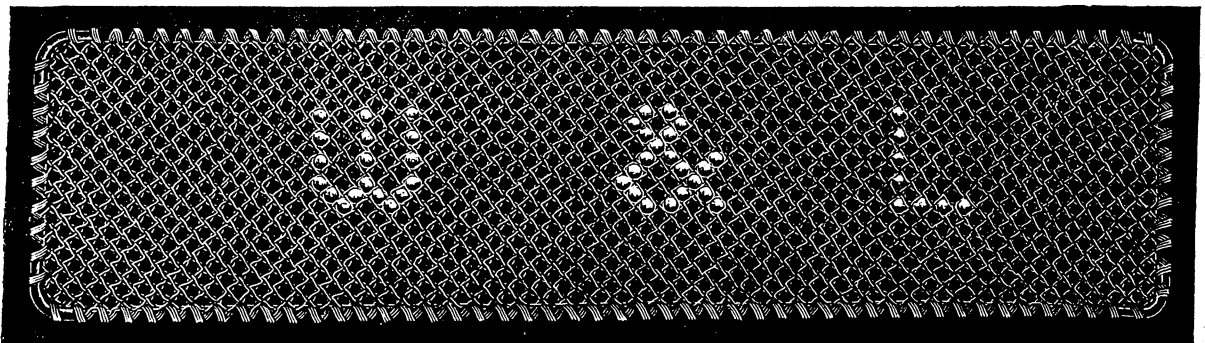
SAMPLES FREE.

FOR PARTICULARS AND PRICES, APPLY DIRECT OR TO OUR AGENT

D. B. McILWAINE, 111 Chambers St., - - - NEW YORK.

HIGH GRADE WIRE MATS

guaranteed to stand any usage and last twice as long as any wire mat offered the trade.



Perfectly flexible corners. Will not turn up. Cheap as the cheapest. Write for discounts.

WHITE MFG. CO., Minneapolis, Minn.

METAL PLATE WORK. Its Patterns and Their Geometry.

Also notes on metals and rules in mensuration for the use of tin, iron and zinc plate workers, &c.

By C. T. MILLIS. Second edition, revised and enlarged. 377 pages, 314 illustrations.

12mo, Cloth, - - - \$3.50.

Sent, postpaid, upon receipt of price by **DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.**

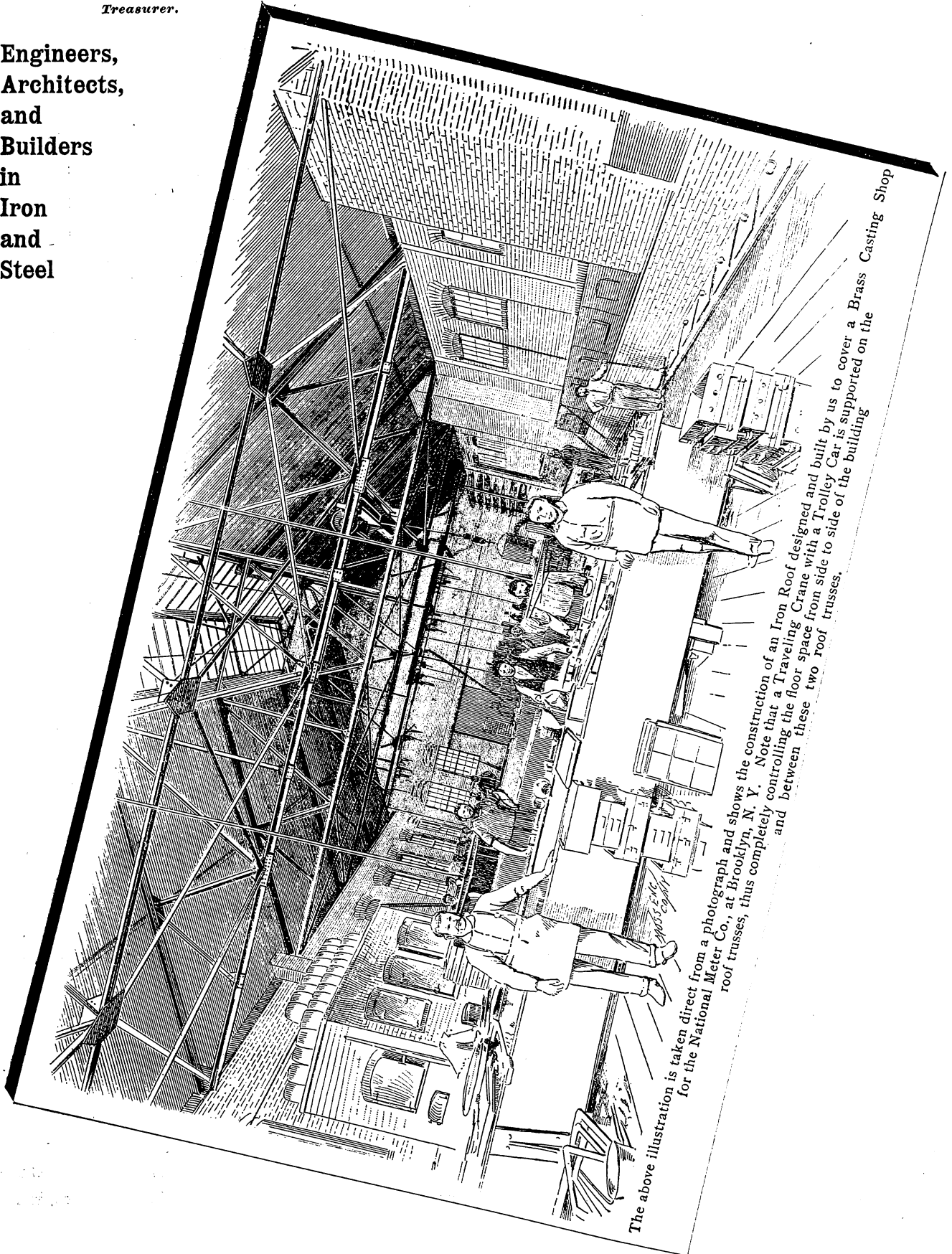
The Berlin Iron Bridge Co.,

CHAS. M. JARVIS,
*Pres. and Chief
Engineer.*
BURR K. FIELD,
Vice-President.
GEO. H. SAGE,
Secretary.
F. L. WILCOX,
Treasurer.

OFFICE AND WORKS:

**No. 5 Railroad Avenue,
EAST BERLIN, . . . CONN.**

**Engineers,
Architects,
and
Builders
in
Iron
and
Steel**



The above illustration is taken direct from a photograph and shows the construction of an Iron Roof designed and built by us to cover a Brass Casting Shop for the National Meter Co., at Brooklyn, N. Y. Note that a Traveling Crane with a Trolley Car is supported on the roof trusses, thus completely controlling the floor space from side to side of the building and between these two roof trusses.

SEND FOR ILLUSTRATED CATALOGUE.

ATLAS TACK CORPORATION.**508 SEARS BUILDING, BOSTON, MASS., U. S. A.**

BRANCHES: { **DUNBAR, HOBART & CO., WHITMAN, MASS.** ESTABLISHED IN 1810. **LORING & PARKS, PLYMOUTH, MASS.** ESTABLISHED IN 1848.
A. FIELD & SONS, TAUNTON, MASS. ESTABLISHED IN 1827. **TAUNTON TACK CO., TAUNTON, MASS.** ESTABLISHED IN 1864.
AMERICAN TACK CO., FAIRHAVEN, MASS. ESTABLISHED IN 1867. **OLD COLONY RIVET CO., PLYMOUTH, MASS.** ESTABLISHED IN 1866.

MANUFACTURERS OF

Tacks, Brads, Small Nails, Shoe Nails, Lining and Saddle Nails, Tufting Nails and Buttons, Wire Nails, Finishing Nails, Patent Brads, Hungarian Nails, Steel Shanks for Boots and Shoes, Wire Tacks, Escutcheon Pins, Eyelets, Glaziers' Points, Rivets, Burrs, Furniture Springs, Pilgrim Spring Bed, and other articles.

We have the largest and only complete and fully assorted stock in the world. Our manufacturing facilities are unequalled. The foregoing well known brands we continue to use, and either will be furnished upon request. We have long distance telephone connection with our New York store and our factories.

MAIN OFFICE, 508 SEARS BUILDING, 199 WASHINGTON ST., BOSTON, MASS.

BRANCH OFFICE & WAREHOUSE, 31 WARREN ST., NEW YORK.

BRANCH OFFICE & WAREHOUSE, 239 & 241 LAKE ST., CHICAGO, ILL.

BRANCH OFFICE & WAREHOUSE, 408 MARKET ST., SAN FRANCISCO, CAL.

BRANCH OFFICE & WAREHOUSE, 406 COMMERCE ST., PHILADELPHIA, PA.

THE NATIONAL SCREW AND TACK CO.,

—MANUFACTURERS OF—



Wood Screws, Machine Screws, Stove Bolts, Tire Bolts, Sink Bolts, Tacks, Trunk, Clout and Small Nails.

CLEVELAND, OHIO.

Tacks, Wire Nails and Brads, Hoop Nails, Staples, Silver and Japanned Lining and Saddle Nails, Double-Pointed Tacks, Slating and Roofing Nails.

BONNIE BLUE TACKS.

100 Kegs full of Tacks for \$1.50.

PARISIAN GILT NAILS.

20 Papers in a Carton. Carton retails for \$1.00; costs 50 Cents.

BILL NYE BRAD BOX.

168 Papers Wire Brads, assorted, from 1/2 to 2 in. Each paper just right to retail for 5 cents. Brings \$8.40; costs \$4.00.

BEST TACK PULLER IN MARKET. FULL OF TACKS.

Retails at \$7.20 per Gross. Costs \$4.00.

GUSTAVE EHRHARDT & SONS,

MACHINE TOOL WORKS.

MANUFACTURERS AND IMPORTERS OF IMPROVED METAL WORKING MACHINES.

Branch of HEINR. EHRHARDT, DUESSELDORF, GERMANY.

Cold Saws and Cold Sawing Machines of our own make a Specialty.

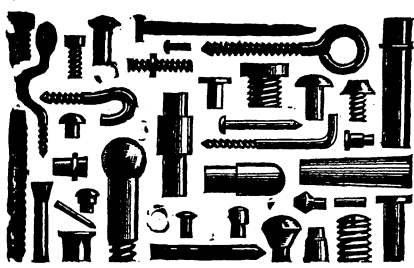
Machine Tools for Railway Shops, Bridge Builders, Architectural Iron Works, Steel and Iron Foundries, Machine and Blacksmith Shops, Iron and Steel Works, Rolling Mills, Forges, etc. Hydraulic Machinery.

Lathes for special purposes, Presses for Corrugated Iron, Straightening Machines, Milling and Grinding Machines, and others.

Catalogues furnished on application.

Send for prices and discounts

Machines can be seen in operation at our Works or at the Chicago Exposition.



IRON AND BRASS RIVETS,

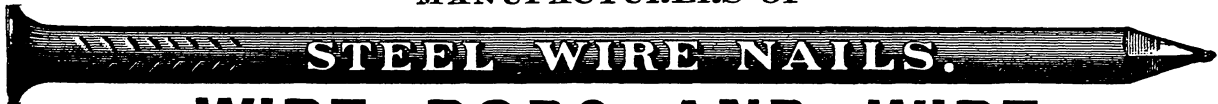
STUDS, PINS, SCREWS, &c.,

For Manufacturers of Light Hardware.

BLAKE & JOHNSON, WATERBURY, CONN.

NEW CASTLE WIRE NAIL CO..

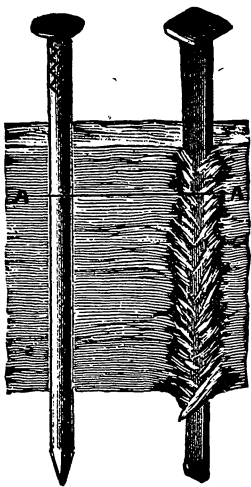
MANUFACTURERS OF



WIRE RODS AND WIRE.

Office and Works,

NEW CASTLE, PA.



THE SALEM WIRE NAIL CO.

MANUFACTURERS

WIRE NAILS

Works: SALEM, O.; FINDLAY, O.

General Office: - SALEM, OHIO.

BRANCH OFFICES:

Room 28, 277 Broadway, New York.

415 Phenix Bldg., Chicago.

200 Amer. Central Bld'g, St. Louis.

19-20 Ainsworth Block, Portland, Ore.

38 Pickering Bld'g, Cincinnati, O.

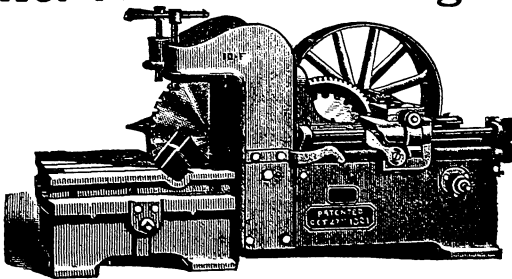
Bryant No. 10 Cold Sawing Machine.

Saves

Time,
Power,
Temper,
Labor.

Gives

True,
Clean,
Rapid
Work.



Cuts

Noiselessly,
Keenly,
Easily,
Inexpensively.

For

General
Bridge and
Railway
Work.

SEND FOR CATALOGUE.

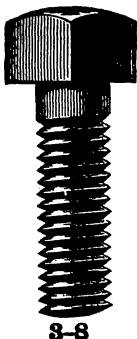
THE Q & C COMPANY, 702-707 Phoenix Bldg., - CHICAGO, ILL.

REYNOLDS & CO..

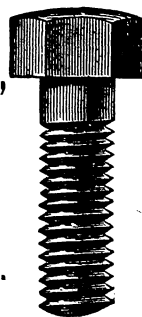
MANUFACTURERS OF

SET, CAP AND MACHINE SCREWS,

STUDS, COUPLING BOLTS, STOVE BOLTS, FINISHED NUTS, &c.



3-8



3-8

Also Hand and Draw-Plate Moulding Machines for Foundry Use.

NEW HAVEN, CONN.

Send for Catalogue.

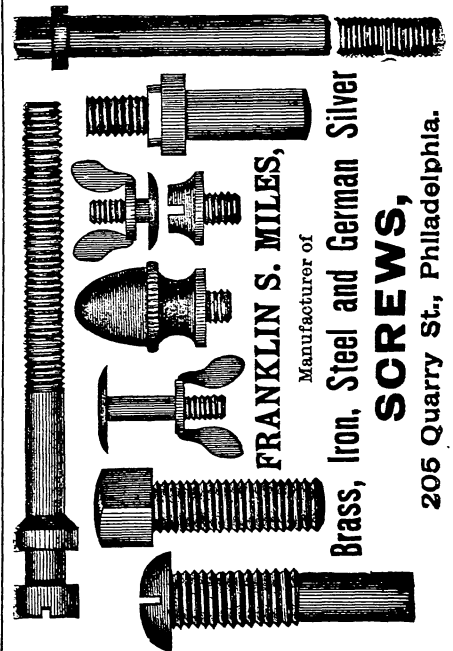
BOOKS

THE NEWEST BOOKS ON Iron, Steel and Metallurgy, Mining, Mechanical and Civil Engineering; Casting and Founding; Electricity and Electric Lighting, promptly supplied on receipt of price by
DAVID WILLIAMS, 96-102 Reade St., New York.

E. PHILLIPS & SONS
SOUTH HANOVER, MASS.

TACKS

F. R. EMMONS & BRO.
21 WARREN ST., NEW YORK.



FRANKLIN S. MILES,

Manufacturer of

Brass, Iron, Steel and German Silver

SCREWS,

205 Quarry St., Philadelphia.

TAUNTON WIRE NAIL CO..

Manufacturers of

WIRE TACK AND NAIL SPECIALTIES,

TAUNTON, - MASS.

DUPLICATING SAMPLES A SPECIALTY.

OXFORD

IRON AND NAIL CO.,

Cut Nails

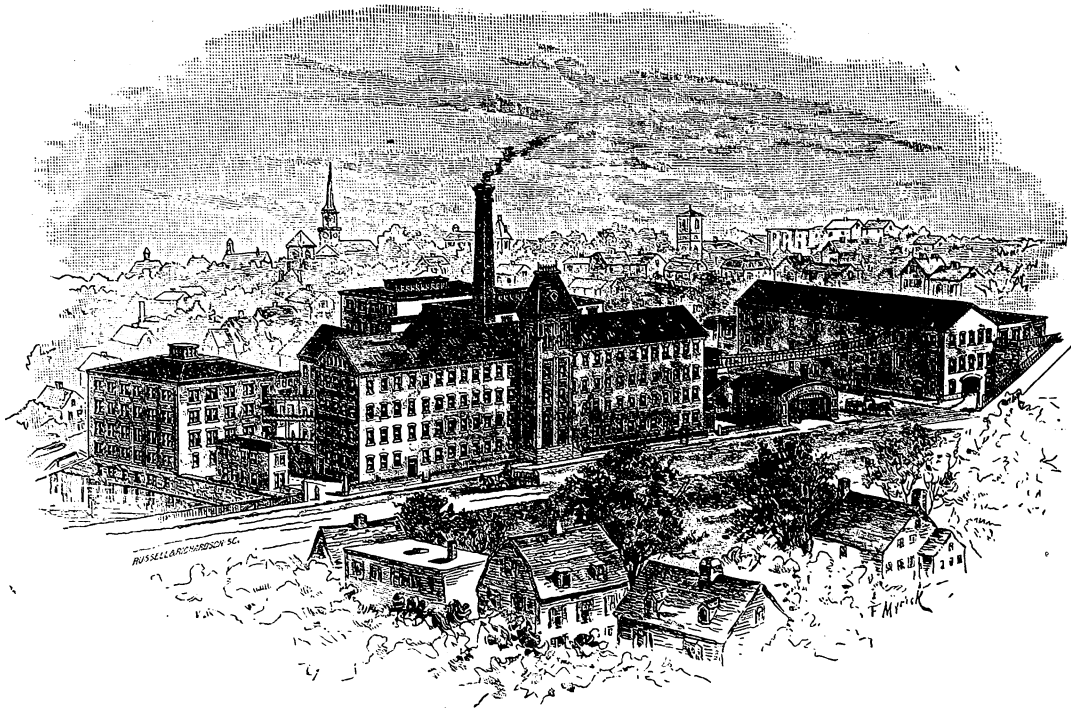
AND

SPIKES.

J. S. SCRANTON, Sales Agent,
81, 83 and 85 Washington Street,
NEW YORK.

American Screw Company,

PROVIDENCE, R. I.



BAY STATE MILL, PROVIDENCE, RHODE ISLAND, U. S. A.

— MANUFACTURERS OF —

WOOD SCREWS,

In Iron, Brass, Bronze and all Varieties
of Finish.

COACH SCREWS,

MACHINE SCREWS,

RAILROAD SCREWS,

HAND RAIL SCREWS,

SIDE KNOB SCREWS,

LOCK CAP SCREWS,

DOWEL SCREWS,

CHANDELIER SCREWS,

RIVETS, BURS,

TIRE BOLTS,

STOVE BOLTS,

SLEIGH SHOE BOLTS,

SINK BOLTS,

STOVE RODS,

POINTED WIRES,

TAPPED NUTS,

WIRE NAILS,

DOWEL PINS,

TAPS FOR MACHINE SCREWS,

TAPS FOR STOVE BOLTS.

**GOLD
FORGED**

Rogers Drive Screws,
Side Knob Screws,
Lock Cap Screws,
Machine Screws,
Stove Bolts,
Forged Wood Screws,
Threaded Wires,
Fluted Tire Bolts.

American Screw Company,


PROVIDENCE, R. I.

Chicago Store, No. 19 Lake St.

EUROPEAN AGENTS, THOMAS & STIRLING, Liverpool

CONSOLIDATED STEEL AND WIRE CO.

GENERAL OFFICES, THE ROOKERY, CHICAGO, ILL.

Branch  { ST. LOUIS, MO., 1935 Papin Street.
PITTSBURGH, PA., Westinghouse Building.
NEW YORK CITY, N. Y., Havemeyer Building.
Offices. { SAN FRANCISCO, CAL., 81 Crocker Building.

BARBED WIRE.

WIRE RODS and PLAIN WIRE of Every Description.

WIRE NAILS.

Bale Ties, Fence Staples, etc.

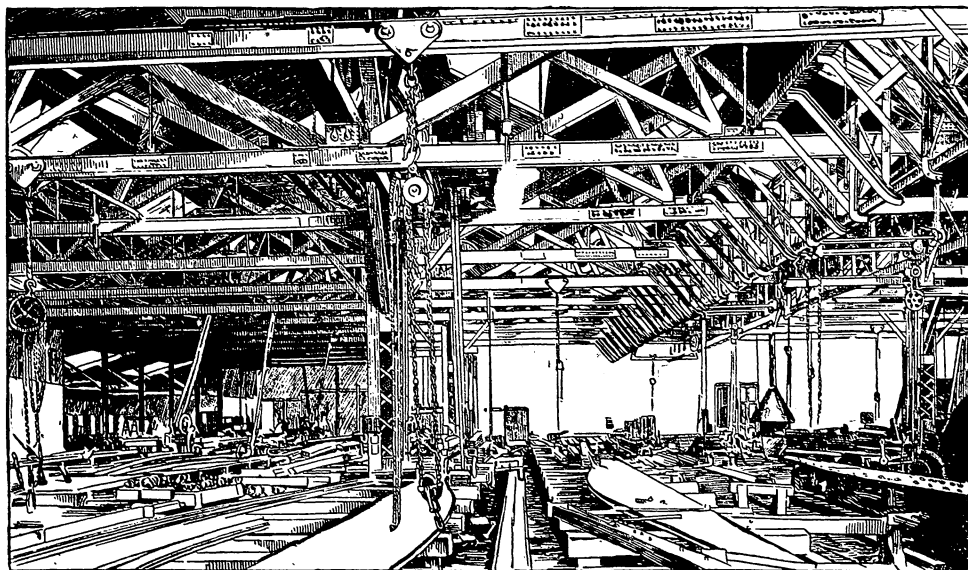
MILLS LOCATED AT

ST. LOUIS, MO. PITTSBURGH, PA. ALLENTOWN, PA.
JOLIET, ILL. LOCKPORT, ILL.

WROUGHT IRON BRIDGE CO. {

CANTON, OHIO.
NEW YORK CITY.
CHICAGO, ILL.
KANSAS CITY, MO.

COMMUNICATE WITH NEAREST OFFICE.



Iron Buildings, Roofs and
General Structural Work
in Iron and Steel, Ma-
chine Shops, Foun-
dries, Power
Houses, &c.

The above is a cut of our new works. The main building is 256 feet square and is fitted with improved machinery for handling all classes of Bridge and Structural work. All machinery is operated by electricity from our own plant.

Catalogue of Books,

Including the principal works on Metallurgy,
Mineralogy, Engineering, Electricity, Mechanics,
&c., sent free to any address by

DAVID WILLIAMS, Publisher,
96-102 Reade Street, NEW YORK.

Established 1830.

THE PLYMOUTH MILLS.

Rivets, Trunk Nails,
Tacks, Clout Nails,
Burrs, Wire Nails.
PLYMOUTH, MASS.

New and Standard Books

- ON -

METALLURGY.

Wedding's Basic Bessemer Process.

Translated from the German by WILLIAM B. PHILLIPS, Ph.D., and ERNST PROCHASKA, Met. E. With supplementary chapter on De-phosphorization in the Basic Open-Heart Furnace. 222 pages; cloth; illustrated. \$3.50

A Treatise on the Metallurgy of Iron.

Containing outlines of the history of iron manufacture, methods of assay and analyses of iron ores, processes of manufacture of iron and steel, &c. By H. BAUERMAN, F. G. S., associate of the Royal School of Mines. Fifth edition, revised and enlarged. Illustrated with numerous wood engravings from drawings by J. B. JORDAN. 515 pages; cloth. \$2

The Metallurgy of Steel.

Volume I. By HENRY M. HOWE, A.M., S.B. mining and metallurgical engineer; illustrated with many engravings and plates. 333 pages; 11 x 14 inches. \$10

Handbook for Charcoal Burners.

Translated from the Swedish of G. Svedelius by PROF. R. B. ANDERSON, and edited with notes by PROF. W. J. L. NICODEMUS, C.E.; 23 wood engravings; 217 pages; cloth. \$1.50

The Metallic Alloys.

A practical guide for the manufacture of all kinds of alloys, amalgams and solders, used by metal workers; together with their chemical and physical properties and their application in the arts and the industries; with an appendix on the coloring of alloys. Translated and edited chiefly from the German of A. KRUPP and ANDREAS WILDBERGER, with extensive additions by W. T. BRANNT; illustrated by 16 engravings; 428 pages; cloth. \$2.50

The Metal Worker's Handy Book of Receipts and Processes.

Being a collection of chemical formulas and practical manipulations for the working of all the metals and alloys, including the decoration and beautifying of the articles manufactured therefrom, as well as their preservation. Edited from various sources by WILLIAM T. BRANNT. 530 pages; cloth. \$2.50

Electro-Plating.

A practical hand-book on the deposition of copper, silver, nickel, gold, aluminum, brass, platinum, &c. With descriptions of the chemicals, materials, batteries and dynamo machines used in the art. Second edition; carefully revised, with additions. By J. W. URQUHART; 220 pages; cloth. \$2

Steel and Iron.

Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the rolling mills, the forge and the foundry. By WILLIAM HENRY GREENWOOD, F.C.S. With 97 diagrams; 536 pages; cloth. \$2

Aluminum.

Its history, occurrence, properties, metallurgy and applications, including its alloys. By JOSEPH W. RICHARDS, M.A., A.C., instructor in metallurgy at the Lehigh University. Second edition, revised and greatly enlarged. Illustrated by 23 engravings and two diagrams; 511 pages; cloth. \$5

Sent, postpaid, on receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller.

96-102 Rensselaer St., New York.

Gautier Steel Department of Cambria Iron Co.,

JOHNSTOWN, PA.

—: MANUFACTURERS OF:—

MERCHANT BAR STEEL:

Including Tire, Toe Calk, Machinery, Carriage Spring, Railroad Spring, Hoe, Rake, Fork, etc.

AGRICULTURAL STEEL AND SHAPES:

Finger Bars, Knife Backs, Rake Teeth, Bundle Carrier Teeth, Tedder Forks and Springs, Spring Harrow Teeth, Harrow (Drag) Teeth, Seat Springs, etc.

PLOW STEEL:

Flat and Finished Plow Shapes, Digger Blades, Slabs, (Penn and Pernot), Hammered Lay, Rolled Lay, etc.

COLD ROLLED STEEL SHAFING.

STEEL HARROW DISCS.

CAMBRIA LINK BARB WIRE.

New York Office,
102 Chambers St.

Philadelphia Office,
S. W. Cor 5th & Commerce Sts.

Chicago Office,
209 Phenix Building.

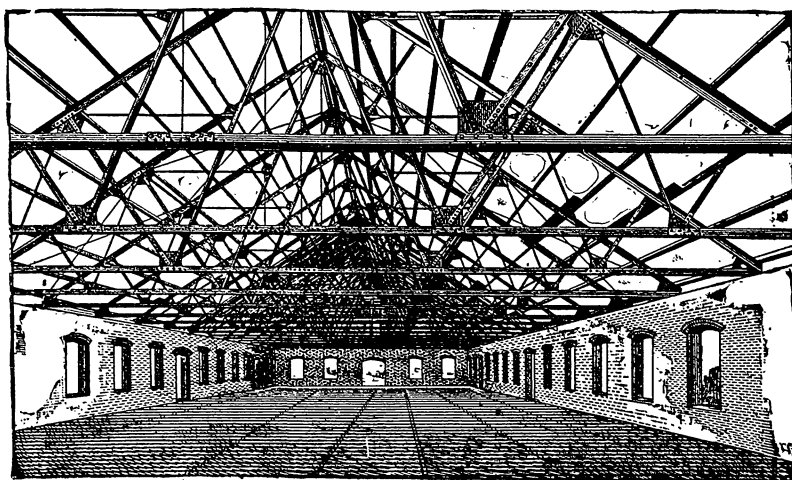
Southern Office,
Chattanooga, Tenn.

IRON AND STEEL BRIDGES, ROOFS AND BUILDINGS

BOSTON BRIDGE WORKS,

Engineers and Builders,

MASON BUILDING, BOSTON, MASS.



Roof of Machine Shop at Portsmouth (N. H.) Navy Yard.

INQUIRIES SOLICITED.

D. H. ANDREWS, Prop'r.
J. R. WORCESTER, Chief Eng'r.

A. S. MILLER, Jr., Sec'y.
R. H. BROWN, Con. Eng'r

H.W. JOHNS' ASBESTOS LIQUID PAINTS

SEND FOR SAMPLE CARD AND DESCRIPTIVE PRICE LIST.

H. W. JOHNS MANUFACTURING CO.,

Sole Manufacturers of H. W. Johns' Asbestos Roofing, Sheathing, Building Felt, Asbestos Steam Packings, Boiler Coverings, Roof Paints, Fire Proof Paints, etc.

VULCABESTON Moulded Piston-Rod Packing Rings, Gaskets, Sheet Packing, etc.
Established 1858. 87 MAIDEN LANE, NEW YORK. PHILADELPHIA, CHICAGO, BOSTON, LONDON.

IRON AND STEEL ROOFING,

Corrugated Iron, Galvanized Eave Trough and Conductor Pipe, Roofing Paints, etc.

Cambridge Roofing Co., Cambridge, O.

Lukens Iron and Steel Co. INCORPORATED 1890.

The First to make Boiler Plates in America.

Chas. Huston, Pres. A. F. Huston, Vice-Prest. C. L. Huston, Genl. Mgr. Robt. B. Haines, Jr., Secy. Jos. Humpton, Treas.

STEEL AND IRON PLATES

TO EXTREME DIMENSIONS. WIDTHS UP TO 10 FEET. THICKNESS, 3-16 INCH TO 1 1/4 INCH.

— ESTABLISHED 1810. —

WORKS:

Coatesville, Pa.

PHILADELPHIA OFFICE:

62 & 64 Bullitt Bldg.

FRANK SAMUEL,
136-138 So. 4th St.,
Philadelphia.

LOW PHOSPHORUS

PIC IRON—.03 or under.
SCRAP—.03 or .05 or under.
ORE—for O. H. and Furnace Use.
MELTING BAR—
Open Hearth and Bessemer Billets,
Skeip, Muck Bars and Scrap, Foundry
and Bessemer Pig Iron.
Syracuse Tube Co.'s Tubes and Pipe.

THE PHOENIX IRON CO., 410 Walnut St., Philadelphia,

MANUFACTURE ALL THEIR PRODUCTS BOTH IN

WROUGHT IRON AND OPEN HEARTH STEEL.

Beams, Channels, Deck Beams, Angles, Tee-bars, Zee-bars and other shapes, Round, Flat and Square BARS of all sizes, Especially adapted for Bridge and Ship Builders, Fire-proof Buildings, Shafting and all Structural Purposes.

SPECIALTIES, in Wrought Iron or Steel:—Phoenix Columns and Upset Eye-Bars of all sizes,

Roof Trusses, Girders, Joists and Built-up Shapes of every description.

AGENTS:—EDWARD CORNING & Co., 29 Broadway, NEW YORK; EDWARD CORNING & Co., 70 Kilby St., BOSTON, MASS; JAMES B. STOKES, 132 Market St., SAN FRANCISCO. WESTERN OFFICE: A. C. STITES, 931 The Rookery, CHICAGO.

POTTSVILLE IRON AND STEEL CO., POTTSVILLE, PA.

PHILADELPHIA OFFICE, 226 SOUTH 4th STREET

MANUFACTURERS OF ALL KINDS OF

STRUCTURAL IRON AND STEEL,

Viz., I Beams, Deck Beams, Channels, Tees, Angles, Plates and Bars; and also Open Hearth Steel Billets, Blooms and Slabs.

BREWERY, MALT AND ICE HOUSE CONSTRUCTION A SPECIALTY.

Designers and Constructors of Roofs, Trusses, Columns, &c.

TESTED CHAINS.

BRADLEE & CO., - EMPIRE CHAIN WORKS,

Beach and Otis Streets, PHILADELPHIA.

Chains for Foundry Cranes and Slings, "D. B. G." Special Crane Chain. Steel and Iron Dredging, Slope and Mining Chains. Ship's Cables and Marine Railway Chains

G. T. WELLMAN, President. J. H. ROOP, Treasurer. C. H. WELLMAN, Superintendent.
S. H. CHAUVENET, Vice-President. RICHARD PETERS, Jr., Secretary.

WELLMAN IRON AND STEEL CO.

— MANUFACTURERS OF —

Highest Grade Open Hearth Low Phosphorus Steel Fire Box and Boiler Plate. Bessemer Steel Ship and Tank Plate. Open Hearth and Bessemer Blooms and Slabs.

Low Phosphorus Pig Iron.

— PLATES UP TO 126 INCHES IN WIDTH. —

General Office and Works, Thurlow, Delaware County, Pa.

Chicago, Ills., No. 656 "The Rookery."
E. W. CRAMER, Agent.

New York, N. Y., No. 7 Nassau Street
J. H. BELCHER, Agent.

BARCLAY W. COTTON & CO.,

Successors to ESHERICK, COTTON & CO.,

Iron and Steel Merchants.

AGENTS FOR

AMERICAN WIRE GLASS MFG. CO.

418 Walnut St., PHILA.

MIFFLIN WHEELER.

G. W. NICOLLS.

Nicolls, Wheeler & Co.,

FORMERLY

SITES, WHEELER & CO.,

216 South Third St., Philadelphia, Pa.

— DEALERS IN —

IRON AND STEEL SCRAP.

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c.,
Steel and Iron Plates, New and Old Rails.

EDWARD CORNING & CO.,

MANUFACTURERS' AGENTS AND COMMISSION MERCHANTS.

BEAMS, CHANNELS,
ANGLES, TEES,
PLATES, BARS, RODS.

IRON AND STEEL

HOOPS, BANDS,
SPIKES, FISH-PLATES,
BOLTS, NUTS, RIVETS.

29 BROADWAY,
NEW YORK.

237 SO. THIRD ST.,
PHILADELPHIA.

70 KILBY ST.
BOSTON.

CORRESPONDENCE SOLICITED WITH BUYERS AND WITH MANUFACTURERS.

EDWARD J. ETTING,
IRON BROKER & COMMISSION MERCHANT.
 222 S. THIRD ST., PHILADELPHIA, PA.
 Pig, Bar and Railroad Iron, Old Rails, Scrap.
 AGENT FOR THE
MOUNT SAVAGE FIRE BRICK,
 Eastern Penna., West New Jersey and Delaware.
Agent TRENTON IRON CO.,
 For the Sale of Wire and Wire Rope.
 Longdale (Va.) and other Pig Irons.
 STORAGE YARD, Pier No. 57 South (old Navy Yard),
 which is connected with Penn. R. R. and its various
 connections. Negotiable Warehouse Receipts issued.
 CASH ADVANCES MADE ON IRON.

ESTABLISHED 1869.
JEROME KEELEY & CO.,
 303 WALNUT STREET, PHILADELPHIA.
Foundry & Forge Pig Irons,
Iron Ores, Coke, Coal,
Steel Blooms, Billets, Rails, etc.
Muck Bars, Blooms, Scrap Iron.
 Consulting Engineers in Metallurgy and
 Mining.

E. H. Wilson. A. Kaiser. J. B. M. Hiron.
E. H. WILSON & CO.,
 222 and 224 South Third St., Philadelphia
 BROKERS AND DEALERS IN
IRON AND STEEL.
 Correspondence solicited.

J. W. Hoffman & Co.,
 333 and 335 Walnut St., Philadelphia,
COMMISSION & MERCHANTS
PIG IRON,
 Iron and Steel Plates and Shapes. Rails, Cars and
 Locomotives, and Railroad Equipment generally.
 CORRESPONDENCE SOLICITED.

JOHN L. HOGAN & CO.,
 IRON COMMISSION MERCHANTS,
 Bullitt Building, 135 South Fourth St., Phila.
 Agents for Brier Hill, Lehigh, Struthers
 AND MUIRKIRK PIG IRON,
 Delaware Rolling Mill, muck bars. Youngstown Steel
 Co., Connellsville Coke.

NORTH BROTHERS MFG. CO.,
Iron and Brass Founders,
Light Castings a Specialty.
 N. W. Cor. 23d and Race Streets,
 PHILADELPHIA.
 Correspondence solicited.

W. H. THOMSON & CO.,
 Dealers in
IRON and STEEL and
other METALS
 FOR ALL PURPOSES,
 Room 259, Bullitt Building,
 PHILADELPHIA, PA.

LUCKNOW FORGE.
JOHN W. REILY,
 Fort Hunter P. O., Dauphin Co., Pa.,
 MANUFACTURER OF
 Blooms and Billets for Boiler Plate, Tubes,
 Sheet Iron and Wire, made from
 Pig Iron and Scrap.
 Prices Quoted—Correspondence Solicited.

B. Houston. J. Max Bernard. H. H. Houston.
C. B. HOUSTON & CO.,
 Bullitt Building. PHILADELPHIA.
 Pig Iron, Coal, Coke, Steel Rails, Structural
 Iron, Steel Castings and Fire Brick.
 Sole Agents for PAXTON ROLLING MILLS.
STEEL AND IRON PLATES.

W. S. PILLING.

T. I. CRANE.

PILLING AND CRANE.
IRON ORES: Lake Superior, Foreign, Concentrates,
 Magnetic and native Self-fluxing.
PIG IRON: Low Phosphorus, Open-hearth, Bessemer
 and other grades.
STEEL: In Blooms, Slabs and Billets, and scrap.
COKE: For Furnace and Foundry use.
 BULLITT BUILDING, 141 S. FOURTH ST. PHILADELPHIA.

E. R. MANN & CO.,
 Sole Agents,
ACME PIG IRON.
 Guaranteed .03 % or lower in Phosphorus.

Blooms, Slabs, Plates, Sheets, Skelp, Muck-Bar and Scrap. Foreign and
 American Ore. Riverside Steel Pipe. Syracuse Boiler Tubes.
147 SOUTH 4th STREET, - - PHILADELPHIA.

ALAN WOOD COMPANY,
 MANUFACTURERS OF
 Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom,
PLATE & SHEET IRON.
 ALSO LIGHT PLATES AND SHEETS OF STEEL,
 No. 519 Arch Street, Philadelphia, Pa.
 Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack
 Tank and Boat Iron; Last, Stamping, Ferrule Locomotive Headlight and Jacket Iron.

CUMBERLAND NAIL AND IRON CO.,
 MANUFACTURERS OF

"Cumberland" Nails & Wrought Iron Pipe,
 43 North Water St., and 44 North Delaware Ave., PHILADELPHIA.

J. J. MOHR,
 Bullitt Building, No. 131 South Fourth St., Philadelphia, Pa.
 —SOLE AGENT FOR—
 Sheridan, Temple, Brooke, Leesport, Mill Creek, Keystone, Mt. Laurel, Logan and Oley FOUN-
 DRY, FORGE, CHARCOAL AND BESSEMER PIG IRON.
 Dealer in Scrap, Old Car Wheels, Muck Bars and Connellsville Coke.

High Grade Tested Chains.
JAMES MCKAY & CO.,
 29TH & LIBERTY STREETS, PITTSBURGH, PA.
 Manufacturers of Coil, Crane and Stud Chain. We also manufacture High Grade
 Steel Chain made of Basic Steel and Special Crane Chain made of U. S. Iron.

JAMES G. LINDSAY & CO.,
 BULLITT BUILDING, 133 South Fourth St., PHILA.
IRON and STEEL STRUCTURAL MATERIAL
 For all purposes. Estimates Furnished for Iron and Steel Structures.

 **DROP FORGED**
MERRILL BROS., 465 to 471 Kent Ave., Brooklyn, E.D., N. Y

FITZSIMONS & CO.,
 —MANUFACTURERS—
GOLD DRAWN SHAFITING IRON STEEL
 CLEVELAND, OHIO.

FRANCIS HOBSON, SEAMAN & CO.,

Successors to FRANCIS HOBSON & SON,
DON STEEL WORKS, SHEFFIELD.

Sole Manufacturers of

HOBSON'S "CHOICE" **(XX)** Extra Best and "Warranted Best"
Cast Steels for Tools, etc.

HOBSON'S "CHOICE" Extra Quality Needle Wire.

SEAMAN'S "NELSON" Brand Extra Cast Steel for Turning Hardest Chilled Rolls, &c.
WAREHOUSE, 97 John St., New York. CHAS. HUGILL, Agent.

THOS. FIRTH & SONS, LIMITED, SHEFFIELD.
CRUCIBLE CAST STEEL.

JERE ABBOTT & CO., Agents and Importers of
SWEDISH IRON,

85 OLIVER ST., BOSTON.

23 CLIFF ST., NEW YORK.

S. & C. WARDLOW, SHEFFIELD, ENGLAND.

Manufacturers of the Celebrated Cast and Double Shear Steel.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch
and all other Springs; also Sole Makers of the Special Brand **"TOUGH"** Cast Steel for Leather Splitting and
Machine Knives of every description, and for Turning and all other Tools, Dies and Punches.

Office and Warehouse, 95 John St., New York.

Frank S. Pilditch, Agent.

GUSTAF LUNDBERG

Agent for N. M. HOGLUND'S SONS & CO. of Stockholm.
Swedish and Norway Iron.

Bessemer and Open Hearth Steel.

19 KILBY STREET, BOSTON.

CARLISLE **KAYSER, ELLISON & CO., SHEFFIELD, ENGLAND.**
WORKS, Late WILSON HAWKSWORTH, ELLISON & CO.,

(ESTABLISHED 1825.)

CRUCIBLE STEEL AND STEEL WIRE.

WETHERELL BROS., Agents.

31 OLIVER STREET, BOSTON.

93 LIBERTY STREET, NEW YORK.

JONAS & COLVER CONTINENTAL STEEL WORKS, SHEFFIELD, ENGLAND,

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Cor-
set Springs, Band Saws, Clock and Watch Springs and Parts, and all other Purposes.

HERMANN BOKER & CO., 101 & 103 Duane Street,

(Formerly CARL F. BOKER),

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

JESSOP'S STEEL

MANUFACTURED BY

WM. JESSOP & SONS, L'D.

OF **Best Quality,**
IN **Bars, Sheets & Plates.**

Large assortment of sizes in stock at

91 John St. - - - - - NEW YORK

And other Agencies.

SHEFFIELD,
ENGLAND.

Gold Medal Paris.
1889.

"F.W. MOSS" SHEFFIELD STEEL & FILES

For further particulars apply
to
NEWTON &

SHIPMAN.

83 John St., New York.

Prices for Direct Importation in Wholesale Quantities From Sheffield.

Improved Mild Centered Cast Steel for Taps, Reamers, &c.....	@ £59	Per ton in Sheffield.
Warranted Extra Cast Steel for Taps, Dies, Milling Tools, &c.....	" 50	" " "
Warranted Cast Steel for tools, Taps, Dies, Turning Tools, &c.....	" 44 10/	" " "
Best Crucible Machinery Steel.....	" 30	" " "
Best C. S. EXTRA WEIGHT HAND CUT FILES.....	@ 50% & 4% cash discount	" " "

No charge for extra sizes when steel is ordered in wholesale quantities of assorted sizes.

CAMBRIA STEEL,

Steel Rails, STANDARD AND LIGHT WEIGHTS, Street Rails and Railway Fastenings,
 BESSEMER AND OPEN-HEARTH BLOOMS, BILLETS AND BARS.
 Steel Axles, Steel Angles, Steel Channels, Steel Forgings
CAMBRIA IRON COMPANY, Office, 218 S. Fourth St., Philadelphia.
 Chicago office, Phoenix Building.
 (WORKS AT JOHNSTOWN, PA.)

A. & P. ROBERTS & COMPANY,
 Pencoyd Iron Works, | Pencoyd Bridge & Construction Co.,
 MANUFACTURERS OF | DESIGNERS AND MANUFACTURERS OF
 Wrought Iron and Open Hearth Steel, | Bridges, Viaducts, Turn Tables, Etc.
 OFFICE: 261 S. 4th Street, PHILADELPHIA, Pa. | WORKS, PENCYD, PA.

EICKEN & CO.'S CRUCIBLE TOOL STEEL

HAGEN, WESTPHALIA, GERMANY.

SPECIAL No. 8 works and Fine-Finishes the HARDEST Rolls and Material. BOSS Cold Chisel; HIGH-GRADE ADAPTED Twist-Drill, Tap, Punch, Die, Reamer, Wood and Milling-Cutter-Steel and Blanks.

HIGHEST QUALITY, LOW PRICES, INDUCEMENTS to the TRADE and large USERS.

REPRESENTED BY } IMPORTERS AND EXPORTERS. } MARKT & CO., Agts.,
 EDW'D VORSTER. } 79-85 North Moore St., New York.
 Stock for immediate wants and Trial Orders. Exclusive Local Agencies granted.

—THE—
Chemical Analysis of Iron.

A Complete Account of all the Best
 Known Methods for the

*Analysis of Iron, Steel, Pig Iron, Iron
 Ore, Limestone, Slag, Clay, Sand,
 Coal, Coke, and Furnace and
 Producer Gases.*

SECOND EDITION.

—BY—
ANDREW ALEXANDER BLAIR,

Graduate United States Naval Academy, 1866; Chief
 Chemist United States Board appointed to Test
 Iron, Steel and other Metals, 1875; Chief Chem-
 ist United States Geological Survey and
 Tenth Census, 1880; Member American
 Philosophical Society, etc.

Handsomely Illustrated by 120 Outline
 Engravings on Wood. Svo. 314 Pages.
 Half Morocco. \$4.00.

The reputation which this book has so quickly won
 for itself among analytical chemists will certainly be
 increased by the improvements in the second edition.
 Every means has been taken to bring it up fully to the
 times, by incorporating all the new and improved
 methods, necessitating the addition of thirty pages of
 letterpress and nine new cuts.

"This work may, in fine, be pronounced a useful
 summary of a special and important department of
 analytical chemistry by an author of prolonged and
 wide practical experience."—*Chemical News*, London.

"Mr. Blair's is a standard work which will prove
 the chief guide of the young chemist, and a frequent
 guide to more experienced analysts."—*The Iron Age*
 New York.

"All iron chemists will find this book an exceedingly
 useful laboratory companion."—*The Chemical Review*
 London.

"It is thorough, accurate, and so complete, as to be
 practically exhaustive of the important subject of
 which it treats."—*Philadelphia Iron*.

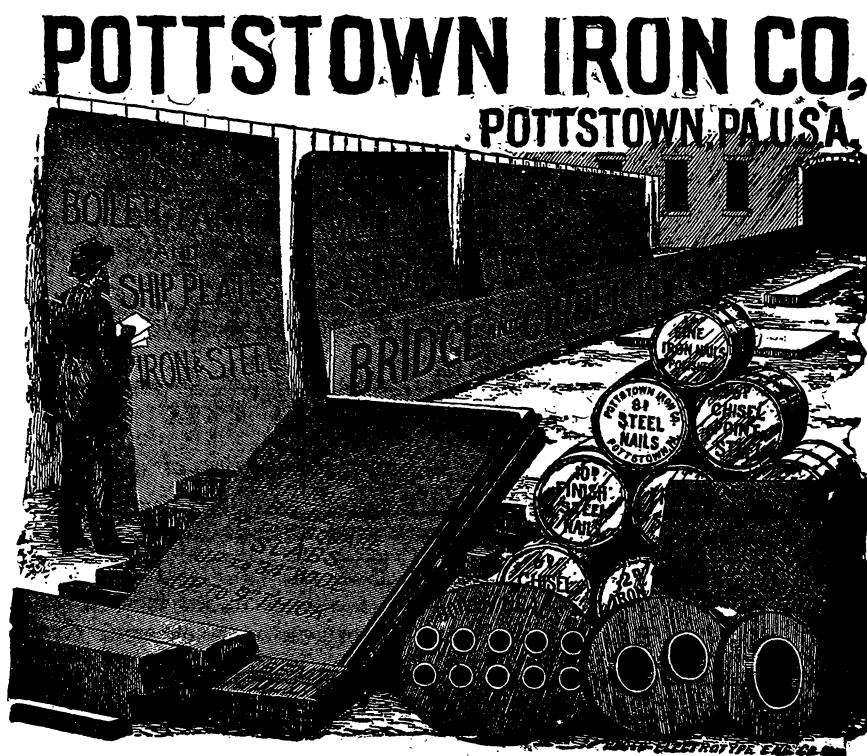
Sent, postpaid, on receipt of price, by

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 Reade St., New York.

A. MILNE & CO.,
Swedish (Norway) Iron and Steel,
 BLOOMS, BILLETS, BARS; WIRE, RIVET AND NAIL RODS.
 FOREIGN AND DOMESTIC IRON AND STEEL.
 1 Broadway, New York. 8 Oliver Street, Boston.



FRANKFORD STEEL COMPANY.
 FRANKFORD, PHILA., PA.
Steel Railroad and Machine Forgings,
 SOLID CRUCIBLE STEEL CASTINGS
 AND
 Best Grades of Tool and Machinery Steel.

ÆTNA-STANDARD IRON AND STEEL CO.,Successors to **Ætna Iron and Steel Co., and The Standard Iron Co.,** Manufacturers of

PLATES and SHEETS, BLACK, GALVANIZED and CORRUGATED Plain Roofing, Siding and Ceiling, also of Sheet Steel, for special purposes, Cold Rolled or Plain and Patent Leveled.
 BARS, LIGHT SECTION RAILS, ANGLES, TEES and CHANNELS, odd sections and sizes, Machine Straightened Steel Tire, Ordinary Shafting, Horse-Shoe Bars, Ax-Poll Steel, Toe Calk, Nut, Bolt and Chain Rods, and other special Bars suited to every requirement.
PROMPT SHIPMENT from STOCK.

Inquiries solicited. Stock List Mailed on Application. Address, **BRIDGEPORT, OHIO.****ILLINOIS STEEL COMPANY**

General Offices, TENTH FLOOR, "ROOKERY," CHICAGO, ILL.,

— MANUFACTURE —

Bessemer, Foundry and Mill Pig Iron, Spiegel and Ferro-Manganese,

Iron and Steel Merchant Bar, Rail Fastenings, Light "T" and Street Rails,

Steel Billets, Wire Rods, Iron or Steel Car Truck Channels,

Steel "I" Beams and Structural Shapes, and

BESSEMER STEEL RAILS.

Julian L. Yale,

Gen'l Sales Agent.

A. M. Crane,

Assistant Gen'l Sales Agent.

New York Office, 46 Wall St., New York City. Milwaukee Office, 151 N. W. Ins. Bldg., Milwaukee, Wis.
 D. E. GARRISON & CO., Agents, Laclede Building, St. Louis, Mo.

E. S. PICKANDS, } CHICAGO.
W. L. BROWN, }**PICKANDS, BROWN & CO.,**PICKANDS, MATHER & Co.
CLEVELAND.

Sole Agents Pig Iron Department Illinois Steel Company and Manufacturers and Dealers in

PIG IRON and IRON ORN,

1007, 1009 and 1011 Rookery Building, Chicago.

CARBON STEEL COMPANY,

PITTSBURGH, PA.,

— MANUFACTURERS OF —



Universal Mill Plates. Sheared Plates and Sheets. Boiler, Ship and Armor Plates. Also
 Nickel Steel Plates. List of Sizes Sent upon Application.

AGENCIES:

L. S. BOOMER, 647 The Rookery, Chicago, Ill.

THE CONDUIT-FULLER CO., Perry-Payne Building, Cleveland, O.

GEO. KINSEY & CO., 249 West Fourth Street, Cincinnati, O.

JAS. G. LINDSAY & CO., Bullitt Building, Philadelphia, Pa.

BULLARD & POST, 125 Milk St., Boston, Mass.



GEORGE MESTA, Prest.

W. D. ROWAN, Sec.

J. O. HORNING, Treas.

LEECHBURG FOUNDRY & MACHINE CO.,

Office: LEWIS BLOCK, Pittsburgh, Pa.

Sheet and Bar Mills, Shears, Squeezers and Roll-Lathes

ROLLS. MESTA'S PATENT PICKLING MACHINES AND TIN PLATE MACHINERY.

ESTIMATES GIVEN ON COMPLETE TIN PLATE PLANTS.

— AMERICAN —**PIG IRON Storage Warrant Co.**

(Bank of America Building.)

44 Wall Street, - NEW YORK.

Correspondence of Furnaces Invited.

PIERSON & CO.,

— DEALERS IN —

IRON and STEEL

OF EVERY DESCRIPTION,

29 Broadway, cor. Morris St.,
NEW YORK.

Tips to Inventors. By ROBERT GRIMSHAW, Ph.D.,
 M.E. Telling what inventions are needed and how
 to perfect and develop new ideas in any lines.
 Cloth.....\$1.00
 For Sale by David Williams, 98-102 Reade St., N.Y.

IRON AND STEEL

BARS, ANGLES, CHANNELS, BEAMS AND
STRUCTURAL SHAPES.

Bridge, Boiler, Tank & Ship Plates.

FOUNDRY and FORGE
Pig Iron, Steel Slabs, Billets and Ingots

CHARLES K. BARNES & CO..

224 South Fourth St., PHILADELPHIA.

L. & R. WISTER & CO.,
IRON COMMISSION MERCHANTS,

257 So. 4th St., Philadelphia.

Agents for the following Foundry and Forge Pig
Irons: Dunbar, Kemble, Tuscarawas (Black
Band), Wyebrooke C. & Co. Charcoal Pig Iron,
Warner & Co.'s (Middlesboro, England),
Carbonizing and Malleable Irons.
Dealers in all kinds of Scrap Iron and Steel.

HENRY LEVIS & CO.,
Manufacturers' Agents

For Iron and Steel Rails, Car Wheels, Boiler
and Sheet Iron and General
Railway Equipments.
Old Rails, Axles and Wheels bought and sold
234 S. 4th St., Philadelphia.

Established 1847.

A. WHITNEY & SONS,
CAR WHEEL WORKS,
PHILADELPHIA.

Special Wheels for Furnace and Mine Cars.

Manhattan Rolling Mill.

JOHN LEONARD,
446 to 452 West St., New York.

MANUFACTURER OF

HORSE SHOE AND BAR IRON
BLACKSMITH SUPPLIES.
Brooklyn Branch, 589 Kent Ave.

OGDEN & WALLACE,
85, 87, 89 & 91 Elm St., New York.

IRON AND STEEL
Of every description kept in stock.
Agents for Park, Brother & Co.'s
BLACK DIAMOND STEEL.

All sizes of Cast and Machinery Steel constantly
on hand.

WILLIAM H. WALLACE & CO.,
IRON AND STEEL,
10, 12 and 14 ALBANY ST.,
and 131 WASHINGTON ST.,
NEW YORK.

Wm. H. Wallace. Wm. Bispham. E. C. Wallace.

THE MAHONING VALLEY IRON CO.

—MANUFACTURERS OF—

Bar, Band, Sheet, Plate and Tank Iron,
Angle Iron, Nails, Boat Spikes and Rivets

YOUNGSTOWN, OHIO.

THE BETHLEHEM IRON COMPANY.

SOUTH BETHLEHEM, PENNA.

STEEL RAILS,
BILLETS AND MUCK BAR,
STEEL FORGINGS.

HOLLOW SHAFTING, CRANKS, ROLLS, GUNS AND ARMOR.
Rough, Machined or Finished, Fluid Compressed, Hydraulic Forged.

NEW YORK OFFICE, - - - 80 BROADWAY.
PHILADELPHIA OFFICE, - - - 421 CHESTNUT ST.

PASSAIC ROLLING MILL CO., Paterson, N. J.

—MANUFACTURE—
ROLLED STEEL or IRON BEAMS

Channels, Angles, Tees, Bars, Riveted Work, Forgings, Eye Bars, &c., &c.,

Also OPEN HEARTH STEEL BILLETS and SLABS.

NEW YORK OFFICE, - Rooms 151 and 152, No. 45 Broadway.

JUSTICE COX, Jr., IRON AND STEEL

No. 218 SOUTH 4th ST., PHILA'D., PA.

Agent Haldeman, Grubb & Co.'s Chickies Bessemer Pig Iron,
Mahoning Rolling Mill Co.'s Best Quality Skelp Iron and Steel,
for Pulaski Iron Co.'s High Grade Foundry and Forge Pig Iron.

Bars, Angles, Sheets, Tank and Bridge Plates, Muck Bars, Blooms, Scrap Iron and Tool Steel.

THE MONTGOMERY IRON & STEEL COMPANY,
DANVILLE, PA.



PIG IRON, T AND STREET RAILS,

Light Rails, 12 to 40 lbs. per yard.

RAIL JOINTS, SPIKES AND BAR IRON.

NAYLOR & CO.,

New York: 45 Wall Street.

PITTSBURGH, PA.: Lewis Block. PHILADELPHIA, PA.: Bullitt Bldg.
CINCINNATI, OHIO: Johnston Bldg.

IRON ORE, PIG IRON,
SPIEGEL AND FERRO,

IRON AND STEEL WIRE RODS, STEEL BLOOMS, BILLETS AND
SLABS, METALS AND OLD MATERIALS.

- R. M. MUSHET'S -
"SPECIAL," **STEEL** "TITANIC,"
FOR
LATHES AND PLANER TOOLS.

(The "Trade-Marks" of which are registered in the United States.)

MANUFACTURED ONLY BY

SAMUEL OSBORN & CO., - - - Clyde Steel & Iron Works, Sheffield, Eng.

SOLE REPRESENTATIVES IN THE UNITED STATES,

B. M. JONES & CO., Nos. 11 and 13 Oliver St., Boston.
No. 143 LIBERTY STREET, NEW YORK.

BOOKS.

YOU CAN OBTAIN PROMPTLY the latest
work on any subject in which you are interested
by addressing DAVID WILLIAMS, Publisher
and bookseller, 96-102 Reade St. New York

ESTABLISHED IN 1848.

SINGER, NIMICK & CO., Ltd.

PITTSBURGH, PA.

—MANUFACTURERS OF ALL KINDS OF—

Hammered and Rolled**STEEL.****Warranted Equal to any Produced.****HIGH GRADE SPECIAL** Crucible Tool Cast Steel, for all purposes requiring the **very finest** quality.**SINGER'S ANNEALED EXTRA** Crucible Tool Cast Steel, for Dies, Cutters, Surgical Instruments, Forceps, and all other purposes requiring an **extra fine** quality.**BEST** Crucible Tool Cast Steel, for all purposes requiring steel of **Standard** quality, such as Turning Tools, Taps, Dies, Drills, Punches, Shear Knives, Cold Chisels, or Edge and Machinists' Tools generally, and for Mining and Quarrying purposes.**SAW STEEL**, for Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.**HOT ROLLED SHEET STEEL**, for Springs, Billet Web and Hand Saws, Nicker Saws, Pocket Knives, Blades and Backs, Drawing and Stamping Cold, &c., &c.**BRIGHT COLD ROLLED SHEET and STRIP STEEL**, for Cold Drawing, Stamping and Bending; for Belts, Cups, Ferrules, Springs, Keys, Chains, Sewing Machine and Type-Writer parts, and to take the place of Sheet Brass, all of unequalled finish and accuracy of gauge.**ROUND MACHINERY STEEL**, for Shafting, Rollers, Spindles, &c., &c.**AGRICULTURAL STEEL.**

"Iron Centre" Cast Plow Steel.

"Soft Steel Centre" Cast Plow Steel.

"Soft Steel Back" Cast Plow Steel.

"Extra Thick Face Centre" Cast Plow Steel.

"Special" (Solid Soft Center) Plow Steel.

Crucible Cast Plow Steel.

Steel Rotary Harrow Discs.

Finished Rolling Plow Colters.

Agricultural Steel Cut to Pattern.

Also Wagon and Carriage Springs, Axles and Steel Tire.

Represented at **243 Pearl and 18 Cliff Streets, NEW YORK**, by**HOGAN & SON, General Agents for Eastern and New England States.**

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA & CO., 110 North St., Boston, and

W. E. STOCKTON, 16 & 18 West Lake St., Chicago.

HUGH RUSSEL, TEMPLE BUILDING, 185 ST. JAMES ST., MONTREAL, CANADA.

LA BELLE STEEL CO.,

Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa

MANUFACTURERS OF ALL KINDS OF STEEL SPRINGS, AXLES, RAKE TEETH, Etc.**WETHERELL BROS., EASTERN REPRESENTATIVES, 31 Oliver St., Boston and 93 Liberty St. N.Y.**

RICE, LEWIS & SON, Toronto, Ont.

J. TATNALL LEA & CO.,

No. 125 So. Fourth St., Philadelphia.

**BESSEMER, MILL AND FOUNDRY PIG IRON,
MUCK BARS AND IRON ORES.**

— SOHO IRON & STEELWORKS —

MOORHEAD & MCLEANE CO.
MANUFACTURERS OF
PLATE IRON & STEEL.
GALVANIZED SHEET IRON
CHB TRADE MARK
CORRUGATED & ROOFING IRONS
PLATES/SPECIAL WIDE
AND SHEETS/AND EXTRA LONG
SKELP IRONS
OFFICES AND WORKS.
PITTSBURGH.
EASTERN WAREHOUSE. No. 81 JOHN STREET, NEW YORK.
WESTERN WAREHOUSE. Nos. 16 & 18 W. LAKE ST. CHICAGO.

W. Dewees Wood Co.,

MANUFACTURERS OF PATENT

PLANISHED SHEET IRON.**PATENTS:**

Feb. 6th, 1877.	Feb. 12th, 1884.	Jan. 6th, 1885.
Dec. 10th, 1878.	Mar. 4th, 1884.	Aug. 31st, 1886.
Jan. 10th, 1882.	April 15th, 1884.	Jan. 1st, 1889.
Jan. 1st, 1884.	June 10th, 1884.	Jan. 17th, 1893.

Guaranteed fully equal, in all respects, to the Imported Russia Iron.

—ALSO—

Wood's Smooth Finished Sheet Irons and Sheet Steel, Cleaned and Free from Dust.

GENERAL OFFICES AND WORKS:

McKEESPORT, PA.

Branch Office: 111 Water Street, Pittsburgh, Pa.

J. WESLEY PULLMAN

No. 238 S. Third St., Philadelphia.

BEST IRON ORESNew Jersey. New York. Lake Superior.
WARWICK PIG IRON.Stay-Bolt,
Rivet, D. Link,
Axe, Hatchet,
Carriage and
Wagon Axle**IRON.****Superior Quality Refined Bar Iron,**
"VULCAN" AND "LOCKHART" BRANDS.

SMALL CHANNELS AND ANGLES,

HEXAGON IRON AND STEEL.**All
Merchant Bar
Sizes
of
Soft****STEEL.**

The THOMSON ELECTRIC WELDING COMPANY

has made an Elaborate Exhibit in the Electrical Building at the World's Fair.

A great variety of Specimens have been sent by many Business Firms using Electric Welding Apparatus, among whom are the following :

Studebaker Bros. Mfg. Co., South Bend, Ind.
Haydock Bros., St. Louis, Mo.
The Johnson Co., Johnstown, Pa.
General Electric Co., Lynn, Mass.
Parry Mfg. Co., Indianapolis, Ind.
Shuttler & Hotz, Chicago, Ill.
Electric Pipe Bending Co., Harrison, N. J.
Gendron Iron Wheel Co., Toledo, O.
Benedict & Burnham Mfg. Co., Waterbury, Conn.

Tamarack-Osceola Copper Mfg. Co., Dollar Bay, Mich.
American Projectile Co., Lynn, Mass.
Carnegie, Phipps & Co., Pittsburg, Pa.
Washburn & Moen Mfg. Co., Worcester, Mass.
Trenton Iron Co., Trenton, N. J.
M. Seward & Sons, New Haven, Conn.
Cortland Forging Co., Cortland, N. Y.
Niles & Scott, La Porte, Ind.
Richmond Cedar Works, Richmond, Va.

Representatives of the Company will be constantly on hand to give any information that may be desired and to make arrangements for apparatus with those who may desire to adopt the Electric Welding Process.

THOMSON ELECTRIC WELDING COMPANY,

89 State Street, Boston, Mass.

MAHONING FOUNDRY & MACHINE SHOP,

BUILDERS OF

Blast Furnaces, Rolling Mill and Mining Machinery,

ROTARY SQUEEZERS, ORE CRUSHERS, ROLL TRAINS, SHEARS, IRON TRUCKS, &c.

Makers of Castings of all descriptions for cable and electric railroads, building fronts, columns, etc. Address

FRANK JAMESON, Manager, Danville, Pa.



Hundreds of testimonials showing these castings have proved the most satisfactory and economical for all purposes requiring strength and durability.

CHROME STEEL WORKS,
Brooklyn, N. Y.

DROP-FORGINGS

—AND—

DIES TO ORDER.

First Class Work.

THE HERBRAND CO., - FREMONT, O.

A. R. WHITNEY & CO.,

MANUFACTURERS AND DEALERS IN

IRON and STEEL.

AGENCIES:

CARNEGIE STEEL CO., Limited, Structural Material, Steel and Iron Columns, Beams, Channels, Shapes and Plates. Steel Beams Rolled to 24 inches deep.
PORTAGE IRON CO., Limited, Merchant Iron, Bars, Angles, Hoops and Cotton Ties.
BROOKLYN WIRE NAIL CO., Steel Wire Nails. Export Nails a Specialty.
RIVERSIDE IRON WORKS, Steel Pipe.
GLASGOW TUBE WORKS, Boiler Flues.
AMERICAN WIRE NAIL MACHINES. Over 900 working satisfactorily in the United States, 25 in Europe and 100 in Canada.
THE SEIDELL & HASTINGS CO., Charcoal-Iron Boiler Plates.
Plans and estimates furnished and contracts made for Iron and Steel Structures of every description. Please address,
29 Broadway, New York.

P. O. Box 33.

TAYLOR

IRON AND STEEL COMPANY.

STEEL FOUNDERS

Licenses in the United States for making Hadfield's Manganese Steel.

STEEL CASTINGS OF EVERY DESCRIPTION.

Specialties: Steel Tired and Solid Steel Wheels; Chilled Iron Wheels; Iron and Steel Axles, etc., etc.

General Office and Works, **High Bridge, New Jersey.**

STEEL PIPE AND NAILS.



SAMPLE OF STANDARD RIVERSIDE STEEL PIPE HAMMERED COLD. (From Photograph.)



SAMPLE OF STANDARD IRON PIPE HAMMERED COLD. (From Photograph.)

PIG IRON, STEEL BLOOMS, STEEL BILLETS, SMALL STEEL T RAILS.

Riverside Iron Works, Wheeling, West Va.

New York Office, 21 BEEKMAN ST.

CHARLES S. STEPHENS, Eastern Representative.

CHESS BROTHERS,

MANUFACTURERS OF A FULL LINE OF

SMALL CUT NAILS, TACKS, SHOE NAILS, ETC

Always in stock. Special goods made to order.

SOFT STEEL PLATES.

Suitable for Implement manufacture and for all Blanking or Stamping uses, of good surface, rolled carefully to gauges, ranging from No. 6 to 16, inclusive, in widths up to 15½ inches and to multiples of lengths desired. Finished black or scaled. And

EXPANDED METAL

In all its varieties of Fire-Proof Lath Fencing, Tree Guards, &c. Send for catalogues and prices.

Office, 531 Wood St., PITTSBURGH, PA.

DROP FORGING

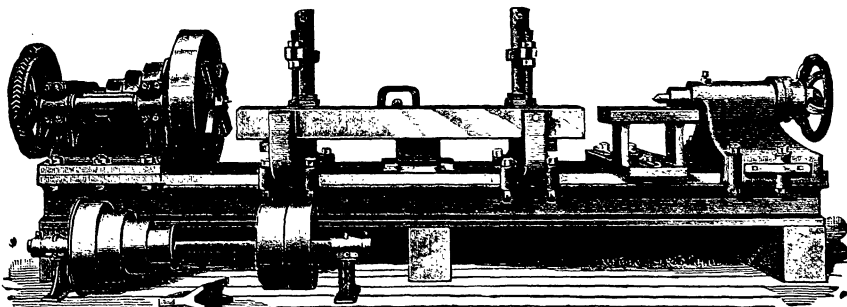
J. C. SPEIRS & CO. WORCESTER, MASS.

J.S. SEAMAN.
ROBT. SLEETH
GEO. P. BLACK

PHOENIX ROLLWORKS
SEAMAN, SLEETH & BLACK
OFFICE & WORKS
41 ST & 42ND ST & AV. R.
PITTSBURGH, PA.

ESTABLISHED 1870

MANUFACTURE AND FINISH
ROLLS AND PINIONS
EXCLUSIVELY.
FOR ALL PURPOSES.

NEW IMPROVED STANDARD ROLL LATHE

Made by TOTTEN & HOGG I and S FOUNDRY CO., Pittsburg, Pa., Manufacturers of
CHILL ROLLS AND ROLLING MILL MACHINERY.

THE CAMBRIDGE IRON & STEEL CO.

MANUFACTURERS OF

SHEET IRON AND SHEET STEEL

Squared Roofing Sheets a Specialty.

CAPACITY RANGES FROM NO. 30
26 INCHES WIDE TO 1-4 x 40 x 20CORRESPONDENCE
SOLICITED

OFFICE AND WORKS CAMBRIDGE, OHIO.

—ESTABLISHED 1850.—

ARCADE MALLEABLE IRON CO.

WARREN MCFARLAND & CO.

Malleable Iron and Steel Castings,

WORCESTER, MASS.

Correspondence solicited. Prices given upon receipt of patterns or samples.

GEO. B. BUCKINGHAM.

John H. Ricketson, Prest. Wm. Holmes, Treas.
A. G. Barnett, Sec'y.

A. GARRISON FOUNDRY Co,

Manufacturers of Sand, Patent Homogeneous, Steel and

Chilled Rolls

Ore and Clay Pulverizers, Rotary Squeezers, Haskin's Patent Double Spiral Pinions and Rolling Mill Castings of every description.

Office, Nos. 10 & 12 WOOD ST., PITTSBURGH, PA.

BIRMINGHAM IRON FOUNDRY,
BIRMINGHAM, CONN.**CHILLED ROLLS AND ROLLING
MILL MACHINERY,**

McCoy Patent Mill Pinions,
Shears, Rotary Squeezers.

WIRE DRAWING MACHINERY

Special Rolling Machines for Gun Bar-
rels, Hoes, Pick and Axe Polls, Odd
Shapes and Tapers.

ESTABLISHED

1836.

POWDER

—FOR—

Blasting, Mining and Sporting.
ORANGE BRAND.

**ELECTRIC BLASTING APPARATUS,
SAFETY FUSE, &c.**

Send postal card for Illustrated Pamphlet,
showing sizes grains Powder, and describing
Blasting Apparatus. Mailed **FREE**.

LAFLIN & RAND POWDER CO.,

New York Office, 29 Murray St.

DYNAMITE,

RED STAR BRAND

For Mining, Quarrying and Stump Blasting.

Safety Fuse, Caps, Platinum Fuse, Leading
and Connecting Wire, with every other requis-
ite for Blasting Purposes. The especial atten-
tion of the hardware trade is invited to our
line of goods.

NEW YORK POWDER CO.,

62 Liberty St., New York.

**S. CHENEY & SON,
GRAY IRON CASTINGS,**

CHEAP HEATING STOVES,

DIAMOND THIMBLES,

MANLIUS, N. Y.

IRON CASTINGS TO ORDER.

Small and Large Grey (or common) Iron Castings of uncommonly fine quality. Four large Cupolas run daily. Castings soft, smooth and strong. Prices very Low.

We make Castings for all purposes, such as Builders' and Domestic Hardware, Electrical work, Piano and Organ, Wringer, Furniture, Lamp and Chandelier and Agricultural Implement Castings, Grates, Furnace and Machinery Castings, &c., &c. If you buy any, write us, stating quantities. Send samples if possible.

SESSIONS FOUNDRY CO., Bristol, Conn.



MCLEOD & HENRY CO

FIRE BRICK

TROY, N.Y.

LIGHT SOFT GREY IRON CASTINGS AND INTRICATE CORE WORK SPECIALTIES.

Estimates cheerfully given on all kinds of Castings.

PEERLESS FOUNDRY CO.,

Washington Ave., above 20th St.,
ROBERT PRESTON, Manager. **PHILADELPHIA**

ESTABLISHED 1856.

HENRY MAURER & SON,

MANUFACTURERS OF

FIRE BRICK

of all Shapes and Sizes,

420 E. 23d St. New York.

B. KREISCHER & SONS,
FIRE BRICK

BEST AND CHEAPEST,

ESTABLISHED 1845.

Office, foot of Houston Street, East River, NEW YORK

BOOK CATALOGUE.

Send for descriptive catalogue with list of contents, of new and standard books on the following subjects:

Assaying and Analysis.

Casting and Founding.

Iron, Steel and Metallurgy.

Locomotive Engines and Cars.

Engineering and Mechanical

Drawing, Machine Designing,

Etc.

Minerals, Mines and Mining,

Plumbing and House Drainage

Heating and Ventilation.

Tools and Machinery.

Steam Engineering, etc.

Mechanical Engineering"

Bridge and Roof Construction.

Pumps, Hydraulics and Water

Supply.

Civil Engineering.

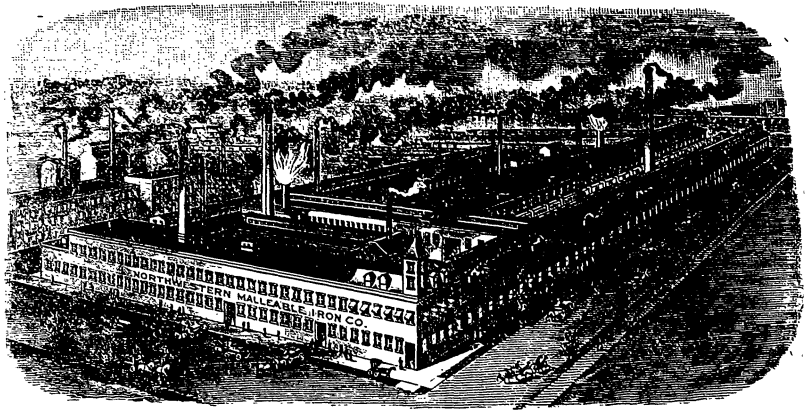
Electricity.

Miscellaneous.

MAILED FREE.

DAVID WILLIAMS, Publisher & Bookseller,
96-102 Reade St., New York.

MALLEABLE IRON CASTINGS TO ORDER.



AGRICULTURAL, RAILROAD AND WAGON WORK.

North-Western Malleable Iron Co.,
MILWAUKEE, WIS.



Soft Castings for Electrical Work and Sewing Machines. Fine Light Gray Iron Castings. Metal Patterns designed and made. Also Japanning and Galvanizing.

CLEVELAND, O.

STEEL CASTINGS

FROM 1 to 40,000 POUNDS WEIGHT,
Of Open Hearth, Chester or Bessemer Steel.

True to Pattern. Sound. Solid.

Gearing of all kinds, Crank Shafts, Knuckles for Car Couplers.

Cross-Heads, Rockers, Piston-Heads, etc., for Locomotives.

Steel Castings of Every Description.

Chester Steel Castings Co.

Works, Chester, Pa. Office, 407 Library St., Philadelphia, Pa.

THE ROBINSON-REA MFG. CO.,
PITTSBURGH, PA.

SAND AND CHILLED ROLLS.
TIN PLATE PLANTS COMPLETE.

(No. 5.)

WYMAN & GORDON, Worcester, Mass.

DROP



FORGINGS.

GRAY IRON, BRASS, ALUMINUM and ALUMINUM BRONZE CASTINGS
of the very best quality.Very much time saved by using clean and soft castings. We use only the best material. A trial will convince you. **PICKETS and ROSETTES** for Wire Workers. Catalogue of same. **NICKEL PLATING and JAPANNING**, also **METAL PATTERN MAKING**. We invite correspondence.**HAIGHT & CLARK, - - ALBANY, N. Y.****DROP FORGINGS****Of Every Description, in Iron, Steel, Copper and Aluminum.**

Hoist Hooks, Shafting Collars, Eye Bolts, Wrenches, Machine Handles, Fence Ornaments.

SPECIAL ATTENTION GIVEN TO THE MANUFACTURE OF SPECIAL FORGINGS.**PHILADELPHIA DROP FORGE COMPANY,**

Office and Works, S. E. Cor. American and York Sts., Philadelphia.

THE JOHNSON FOUNDRY CO.,
JOHNSTOWN, PA.**CHILLED AND SAND ROLLS.**
GENERAL CASTINGS.**STANDARD FOUNDRY & MFG. CO., - CLEVELAND, OHIO**

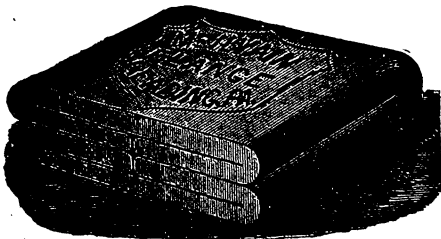
—HEADQUARTERS FOR—

LIGHT GRAY IRON CASTINGS.

—UNEQUALED IN—

SOFTNESS and SUPERIOR FINISH.

Our Castings in finishing will save time and tools. We solicit a trial order knowing that we can please you. Send samples for prices.

TENSILE STRAIN. } 56,000 to 64,000 lbs.**CAPACITY.** { Plates 1 inch thick to No. 12.
30 feet long.
70 inches wide.**WM. McILVAIN & SONS,**
READING, PA.,

MANUFACTURERS OF

IRON AND STEEL
BOILER PLATES.

Locomotive, Fire Box, Flange, Shell, Tank Iron and Steel, including Plates for Bridges, Girders, Stacks, Pipe and Fire and Burglar-proof Safes.

THE ASCHMAN STEEL CASTING CO.,
MANUFACTURERS OF**Open Hearth Steel Castings of all Kinds.**

Solid and Equal to Steel Forgings.

Send Sketch and Get Estimate.

Prompt Delivery.

OFFICE AND WORKS, SHARON, PA.

The Trenton Malleable Iron Company.**MALLEABLE CASTINGS**

Made from Refined Air Furnace Iron.

SPECIALTIES: Malleable Iron Castings, Car Couplers, R. R. Supplies, Street Car R. R. Supplies, Car Replacers, Malleable Iron Castings for Contract Work, Frog and Switch Castings, Castings—Light and Heavy, Journal Box Castings, Car Trimmings.

Prices given upon receipt of Patterns or Sample Castings.

Trenton - - - - - New Jersey.**R. D. Wood & Co.** 400 Chestnut St. **PHILADELPHIA.**

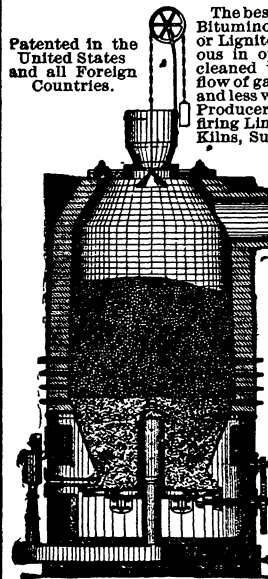
SOLE MAKERS OF THE

TAYLOR REVOLVING-BOTTOM GAS PRODUCER.

Patented in the United States and all Foreign Countries.

The best Producer for either Bituminous or Anthracite coal or Lignite; absolutely continuous in operation, as the fire is cleaned without stopping the flow of gas. Less labor required and less waste than in any other Producer. Producer Gas for firing Lime, Brick and Pottery Kilns, Sugar-house Char Kilns, Boilers, etc.

Also applicable to all Regenerative Furnaces. Send for Pamphlet.

**CAST IRON PIPE****MATHEWS' FIRE HYDRANTS EDDY VALVES, VALVE INDICATOR POSTS.**

Heavy Loam Castings Special Machinery.

Water Power Pumps and **TURBINES.****HYDRAULIC JIB and TRAVELING CRANES, FREIGHT and CAR LIFTS, Etc. GAS HOLDERS and GAS MACHINERY.****WEST COXSACKIE IRON FOUNDRY.**Soft, **CASTINGS** Grey, Light Medium

We solicit correspondence. Prices on application.

COXSACKIE, N. Y.**A Trial will Convince You**

— THAT WE MAKE —

SOFT AND SMOOTH
Light Gray Iron Castings,

- - SOUND - -

Brass and Bronze Castings**TRUE TO THE PATTERN.**

Also HAVE FACILITIES FOR FINISHING. Sample for estimate solicited.

I. S. SPENCER'S SONS, Guilford, Conn.**DONALDSON IRON COMPANY,**

MANUFACTURERS OF

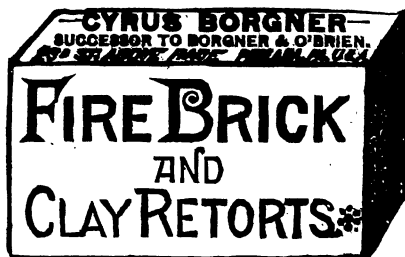
**CAST IRON PIPE**And Special Castings for Water and Gas. Also Flange Pipe **Emaus, Lehigh Co., Pa.****FRANCIS WISTER,**
COMMISSION MERCHANT,
COKE, COAL, ORES.

National Foundry Coke a Specialty. Sulphur less than 0.5.

All sizes National Crushed Coke. **Guilford Building, PHILADELPHIA.****FINE GRAY IRON****FRANKLIN IRON FOUNDRY,**
The Burr and Houston Company

33-39 Franklin Street, Brooklyn (Greenpoint), N. Y.

Special Attention Given to Fine Castings. Telephone Call Greenpoint 174.



ESTABLISHED 1864.

JAMES GARDNER & SON,

MANUFACTURERS OF

**"STANDARD SAVAGE" FIRE BRICK
TILE and FURNACE BLOCKS**

OF ALL SHAPES AND SIZES.

WORKS, Ellerslie, Allegheny Co., Md.
OFFICE, Cumberland, Md.; P. O. Box 540S. M. Hamilton & Co., Agents, - Baltimore, Md
Stowe, Fuller & Co., Agents, - Cleveland, O

Established 1848.

OSTRANDER FIRE BRICK CO.

Manufacturers of

FIRE BRICK**FOR ALL PURPOSES****TROY, N. Y.****UNION MINING COMPANY
MOUNT SAVAGE FIRE BRICK.**Agent for Eastern Penna., West New Jersey and Delaware
EDWARD J. ETTING,
222 South Third St., Philadelphia, Pa.**ELEMENTS OF COST.**

By Frederick W. Child.

20 PAGES,

5 x 7 1/4 Inches.

Paper, 25 cents.

An address to the Institute of Accounts, New York, of which the writer is a member, put in form to assist those in charge of manufacturing accounts. Practical forms are included for a series of order books, examples of foreman's order, form of pay-roll, quarter-time book, job time book, form of summary, charges book, summary of costs, material, labor, cash, expense, manufacturing and improvement acts, store-room, iron foundry, brass foundry.

Sent, post-paid, upon receipt of price, by

DAVID WILLIAMS, Publisher and Bookseller,

96-102 Reade Street, New York

THE GALLOWAY BOILER.

Safety, Maximum Economy in Fuel, Lowest Cost of Maintenance.
Greatest Durability, Large Steam and Water Spaces.

Are the Advantages Offered by this Boiler.

SPECIFICATIONS AND PRICES UPON APPLICATION TO

EDGE MOOR IRON COMPANY,**Post Office, Wilmington, Delaware.**

WILLIAM SELLERS, Pres't.

JOHN SELLERS, Jr., Vice-Pres't.

H. B. BRADFORD, Supt.

WM. F. SELLERS, Secretary.

WILLIAM H. CONNELL, Treasurer.

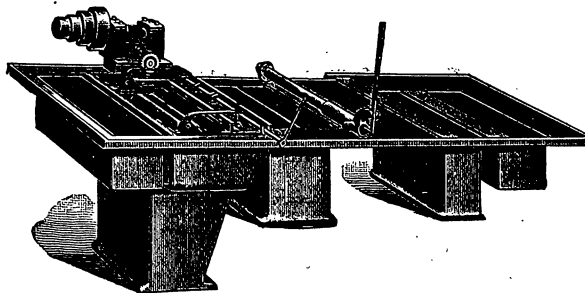
F. W. HEISLER, Purchasing Agent.



ESTABLISHED 1876.

THE SARGENT COMPANYFORMERLY *The Congdon Brake Shoe Co.***IRON & STEEL FOUNDERS**

59TH & WALLACE STS. CHICAGO.

BRAKE SHOES-STEEL CASTINGS.**THE LLOYD BOOTH CO.,****YOUNGSTOWN,
OHIO.****Tinning
MACHINERY.****Rolling Mills,
Sand and Chilli
ROLLS.****THE GARTLAND FOUNDRY CO.,**

MANUFACTURERS OF

Light Work our
Specialty.**Soft Grey Iron Castings.**We are prepared
to do Japanning and
Galvanizing.UNION and ECHO STS.,
Cleveland, Canton & Southern R. R.,**CLEVELAND, O.****Haines Gauge Co.,**

906 Filbert St.,

**PHILADELPHIA,
PA., U. S. A.****The HAINES Automatic Micrometer Rolling
Mill GAUGE.**

For reducing HOT WORK in process of rolling

THE S. Obermayer Co.,

FOUNDRY FACINGS, PLUMBAGO and
Manufacturers of FOUNDRY SUPPLIES, Importers of INDIA SILVER LEAD
FOUNDRY EQUIPMENTS. FOR ALL PURPOSES.
Selling Agents for BLAKENEY CUPOLA.

CINCINNATI, OHIO.

Send for Catalogue.

**Foundry
Facings**

**Foundry
Supplies**

MANUFACTURERS,
J. W. PAXSON & CO.
Philadelphia, Pa.

GROUND SILICA ROCK,
FIRE BRICK,
FOUNDRY LADLES,
TUMBLING BARRELS.
CORE-COMPOUND.

WHEN MOST FOUNDRYMEN WANT TO MAKE

Exceptionally FINE, SMOOTH and BRIGHT CASTINGS, they order FOUNDRY FACINGS, PLUMBAGO and FOUNDRY SUPPLIES.

From the CHICAGO FOUNDRY SUPPLY CO., CHICAGO, ILLS.

In proof of this see the beautiful stoves and other fine castings of all sizes, weight and descriptions now on exhibition at
THE WORLD'S FAIR.

Three-Fourths of which were made with the assistance of our Foundry Facings and Blackings, Plumbago and "Peerless" Perfect Wash. "The names of the manufacturers is legion"—their addresses would cover several pages of this journal, and to select from among them would render us guilty of invidious distinctions and distasteful ungraciousness. World's Fair Visitors are respectfully invited to call upon us at our office, No. 503 Teutonic Building, where they will be welcomed with special attention. Stenographers, Typewriters, Stationery, etc., at their service.

Works, corner 18th and Rockwell and C. B. & Q. R. R.

Open to inspection of visitors with card from Office. Polite reception Insured



Flat Molding

is best accomplished with the use of
"Radiant Facing." It sticks and doesn't
run away.

THE J. D. SMITH FOUNDRY SUPPLY CO.,
CINCINNATI, O.

WESTERN FOUNDRYMEN, SAVE TIME, MAKE MONEY.

Order Facings and Foundry Supplies from
The MacKellar Foundry Facing & Supply Co. Quincy, Ill.

THE ALLENTOWN ROLLING MILLS,

MANUFACTURERS OF

Pig Iron, Merchant Bar Iron, Rolled Shafting, Mine Rails, I-Beams, Tee Bars, Flat Plates, Bolts, Nuts and Spikes.

Transfer and Locomotive Turn Tables, Blast Furnace, Rolling Mill and Mining Machinery, Mining Pumps, Etc. Roll Trains, Shears, Punches, Iron Trucks, Etc. Builders of all classes of Machinery. Makers of Castings of all descriptions for Cable and Electric Railway.
ALLENTOWN, PA.

DROP FORGING.

ESTIMATES GIVEN ON APPLICATION.

Sole Manufacturers of Ahlstrom's Patent Parallel Double

EXPANSION BOLTS,

also Single Expansion Bolts. Catalogues mailed on Application.

W. C. BOONE MFG. CO. - Office and Factory, - **BOONTON, N. J.**

CASTINGS

(GRAY IRON)

Made to order. Send samples for estimate

Shilling Foundry Co.,
COLUMBUS, O.

COLD DRAWN STEEL

SEAMLESS TUBING

SHELBY STEEL TUBE CO.



From $\frac{1}{8}$ to $1\frac{1}{4}$ inches in diameter and from No. 8 gauge to 26. Made from the best quality of steel, guaranteed perfect and to stand the severest tests. Reasonable in price. Address, for samples and prices,

SHELBY, OHIO.

THE IRON-FOUNDER:

A COMPREHENSIVE TREATISE ON

THE ART OF MOLDING,

INCLUDING CHAPTERS ON

CORE-MAKING; LOAM, DRY-SAND, AND GREEN SAND MOLDING; ALSO CRYSTALLIZATION, SHRINKAGE, AND CONTRACTION OF CAST IRON, AND A FULL EXPLANATION OF THE SCIENCE OF PRESSURES IN MOLDS; ADDED TO WHICH ARE FORMULAS FOR MIXTURES OF IRON, TABLES, RULES AND MISCELLANEOUS INFORMATION.

BY

SIMPSON BOLLAND,

Practical Molder and Manager of Foundries

Illustrated with over Three Hundred Engravings.

12mo, Cloth, \$2.50.

Will be sent free on receipt of the price.

"Among the many recent additions to technical literature, we know of none of more practical value than THE IRON FOUNDER. There are thousands of men in our foundries who will be greatly benefited by its 332 pages of interesting and valuable information."—The Age of Steel.

SENT, POSTPAID, ON RECEIPT OF PRICE, BY

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 Reade St. New York.

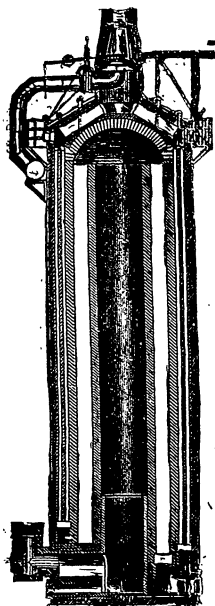
Forgings of Machinery or Tool Steel.

TRETHERWEY MFG. CO., 47th ST., PITTSBURGH, PA.

MANUFACTURERS OF

Rolling Mill Machinery, Steam Hammers, Squaring Shears, Double Headed Rotary Shears, Shear Grinding Machinery, Circle Cutting Machines, Roll Lathes, Hardened Forged Steel Rolls, Roll Turning Tools. Solid Steel Shear Knives. Tool Steel Dies of any size.

McCLURE, AMSLER & CO. *Engineers and Contractors*



Bissell Block,
PITTSBURGH, PA.

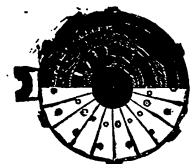
**Blast Furnace
Construction**

A SPECIALTY.

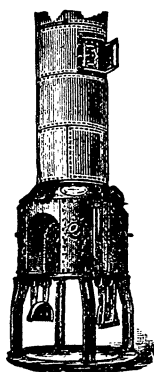
Sole Agents for
MASSICK'S & CROOKE'S
PATENT

**Fire Brick
Stoves,**

Designs and Estimates
for the construction of
Blast Furnace Work,
and for all kinds of Hot
Blast Fire Brick or Pipe
Stoves; and all other kinds
of Brick Work pertaining
to Steel Plants, Iron, Brick
or Wooden Buildings, all
kinds of Iron Construction
in general.



*We propose to put into successful
operation all the plants we design and
contract for.*



THE COLLIAU PATENT
Cupola Furnace

Melting capacity of output
for the year 1892,

**824,442
NET TONS.**

Correspondence Solicited.
BYRAM & COMPANY,
Exclusive Manufacturers,
DETROIT, - - - MICH

HENRY AIKEN,

Consulting Mechanical Engineer,

Rooms 203-206 Lewis Block,
PITTSBURGH PA.

EXHAUST TUMBLERS,

Hexagon, Round or Wooden
BEST AND CHEAPEST.

WM A. SWEETSER
39 Montello St., Brockton, Mass

THE S. R. SMYTHE COMPANY, INCORPORATED.

LEWIS BLOCK, ENGINEERS AND CONTRACTORS. PITTSBURGH, PA.

**Regenerative Gas Furnaces and Gas Producers
For All Purposes.**

TUBE, STEEL, ROLLING MILLS, GLASS WORKS CONSTRUCTION, Etc.

We contract for complete Plants, guarantee results and satisfactory operation
of same.

OVER 100 PLANTS IN SUCCESSFUL OPERATION.

JULIAN KENNEDY.
Consulting and Contracting Engineer,

Rooms 36, 37, 38, 39 Vandergrift Building, Pittsburgh, Pa.

Blast Furnaces, Bessemer and Open Hearth Steel Works, Rolling Mills.

STEAM AND HYDRAULIC MACHINERY, &c.

—Branch Office of The Latrobe Steel Works.—

Wm. Swindell & Bros.,
ENGINEERS AND CONTRACTORS,

**Regenerative and Recuperative Gas Furnaces for
Steel, Iron and Glass.**

SWINDELL'S IMPROVED GAS PRODUCERS,

243 BUILT SINCE APRIL 1, 1891.

P. O. Box 945.

548 Smithfield St., Pittsburgh, Pa.

ALEX LAUGHLIN & CO.

LEWIS BLOCK, PITTSBURGH, PA.

GAS HEATING
GAS PUDDLING
CRUCIBLE
OPEN HEARTH
TUBE WELDING

FURNACES

AND ARTIFICIAL GAS PRODUCERS OF EVERY
DESCRIPTION, FOR ROLLING MILLS, STEEL AND TUBE WORKS.
We guarantee to place all plants erected by us in successful operation.

J. A. HERRICK, M. E.,

Consulting Engineer and Contractor.

Room 609, 284 Pearl Street, NEW YORK.

— **STEEL CASTING PLANTS A SPECIALTY.** —

Melting and Heating Furnaces of ALL KINDS.

Patent Gas **WATER VALVES.** Improved "BASIC" and "SEMI-
STEEL" Processes and **FURNACES.**

New **CONTINUOUS** Gas **PRODUCERS.**

JAMES P. WITHEROW CO.,

SHOPS: New Castle, Pa.

GENERAL OFFICES: Times Building, Pittsburgh, Pa.

ENGINEERS, CONTRACTORS, &c.

JAMES P. WITHEROW, General Manager.

JAMES HEMPHILL, President.
WM. H. CONLEY, Treas. rev.

THOS. B. RITER, Vice-President.
JNO. F. WILCOX, Gen'l Manager.

PITTSBURG IRON & STEEL ENGINEERING CO.

LEWIS BLOCK, PITTSBURG, PA., U. S. A.

BESSEMER AND OPEN-HEARTH STEEL PLANTS.

Rolling Mills (Blooming, Rail, Plate, &c). Blast Furnaces, Engines
Boilers, Bridges, Girders, Iron Buildings.

WORKS BUILT COMPLETE and Fully Equipped for Operation.

THE D. R. LEAN COMPANY, ENGINEERS and CONTRACTORS,

Penn Building, Pittsburgh, Pa.

Blast Furnace and Steel Plant construction. Regenerative
Gas Furnaces and Gas Producers.

Sole Agents **FORD & MONCUR'S** Fire Brick Stove, Machinery
and Castings, Iron Buildings, &c.

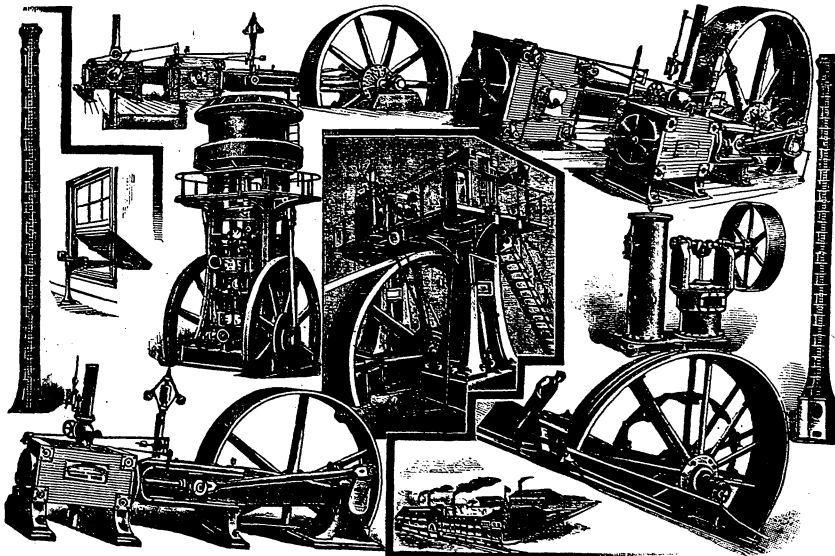
WILKIE, BOTHWELL & CO., Ltd.

Engineers and Contractors. ∴ Blast Furnaces and Steel Works

We make a specialty of Repair Work, and can furnish a full line of Valves and Fitting,
for Whitwell and Cowper-Kennedy Stoves.

606 Times Building, Pittsburgh, Pa.

— PHILADELPHIA CORLISS ENGINES. —
AIR PUMPS AND CONDENSERS.
BAND AND FLY WHEELS. STEEL-PLATE CHIMNEYS.
— BLOWING ENGINES. —



BUILT BY
PHILADELPHIA ENGINEERING WORKS, LIMITED,
MIFFLIN STREET, EAST OF FRONT,
PHILADELPHIA, PA.

HENRY J. CARTEN,

ENGINEER AND CONTRACTOR,

REGENERATIVE GAS FURNACES AND ARTIFICIAL GAS PRODUCERS,
Room 15, Stevenson Building, Pittsburgh, Pa.,

Special attention given to Gas producer plants not working satisfactorily.

CORRESPONDENCE SOLICITED.

BOILERS

WE make a better stationary tubular boiler, make it of flange steel, with weldless braces and eclipse manholes, and sell them for one-third less than the old style. Send for lithographs and detail illustrations.

Fulton Steam Boiler Works & Foundry,
RICHMOND, IND.

The Iron-Masters' LABORATORY.

Exclusively for the

*Analysis of Ores of Iron Pig and Manu-
factured Iron, Steels, Limestone, Clays,
Slags and Coal for Practical
Metallurgical Purposes.*

Branch Office, 339 Walnut St., Philadelphia.

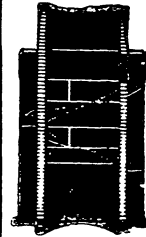
All Analytical Work at Warrenton, Virginia.
J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

VICTOR COLLIAU,

Sole builder of his

New and Improved Patented



**HOT-BLAST
Colliau Cupola,**

287 Jefferson Ave.,
DETROIT, MICHIGAN,
U. S. A.

M. V. SMITH, PRES.
C. C. MORROW, SEC.

M. A. GREENE, VICE-PRES.
JOHN A. ELLIOTT, TREAS.

Artificial Gas Engineering Co., Consulting and Contracting ENGINEERS.

ARTIFICIAL Gas applied to all Branches
of Manufacturing and Domestic Uses.
Apparatus for the Manufacture of
Coal-Gas Furnished at Lowest Prices.

706 TIMES BUILDING,
PITTSBURGH, PA.

Patent Tumbling Barrels.

MANY VARIETIES

For all Kinds of Work.

Send for new Catalogue.

HENDERSON BROS., WATERBURY, CONN.

Frank C. Roberts & Co., CIVIL ENGINEERS.

Blast Furnaces, Steel Works, Rolling
Mills, Iron and Steel Bridges and Build-
ings, Factory and Warehouse Construction

OFFICES:

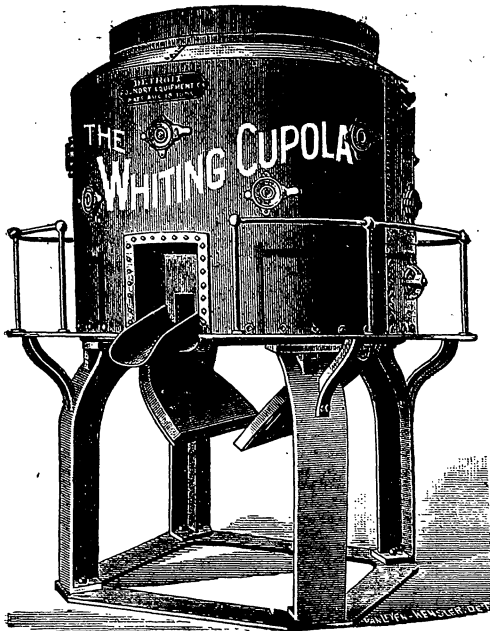
S. E. Cor. 4th and Chestnut Sts., Philadelphia, Pa

WILHELM & CO.,

Telegram Building, ROOMS, 15, 16, 17 & 18,
HARRISBURG, PA.

Iron Ore, Pig Iron, Boiler Plates, Nails,
Steel Rails, Coke, Bituminous Coal.

Telephone, No. 1503.
Western Union and Postal Telegraph Wires in Office.
Cable Address, "WILHELM."



The Whiting Patent Cupola.

There is no Better

Time to buy a cupola than the present.

Prices were never lower and the opportunities of erecting at a minimum of expense and inconvenience were never better.

If you have not seen our latest Catalogue of the "Whiting," send for one and post yourself on the best and most modern Cupola.

Twelve sizes.

MANUFACTURED ONLY BY

Detroit Foundry Equipment Company,

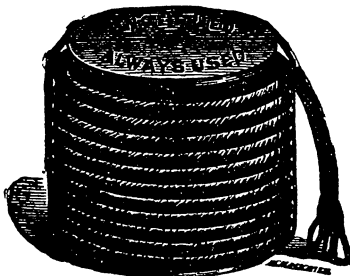
DETROIT, Michigan Ave. and D. & B. C. Ry.

CHICAGO, 225 Dearborn Street.

MANUFACTURERS OF

CRANES LADLES, TUMBLERS, TRUCKS.

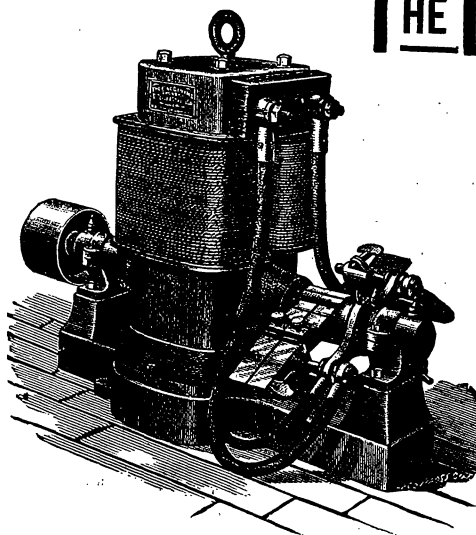
Whiting's Improved Car Wheel Foundry Plant. Write for Circulars.



Send for a Sample of
Morrison's Patent Self-Lubricating Packing,
ROBT. MORRISON,
5034 Arsenal St., St. Louis, Mo



SEND FOR CATALOGUE "A."



THE DETROIT DYNAMO CO.

(INCORPORATED),

DETROIT, MICH.,

Electroplating,
Electrotyping,
Copper Refining,
Arc and
Incandescent
Lighting.

MFRS. OF

"King"
Dynamos

Fan Ventilating
and Power Motors.

DEALERS IN
ELECTROPLATERS' SUPPLIES.

HARRISBURG Foundry and Machine WORKS

General Office and Works: HARRISBURG, PA., U. S. A.

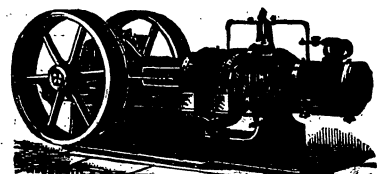
THE HARRISBURG Ideal Tandem Compound Engine.

SUPERIOR REGULATION.
PERFECT EQUILIBRIUM IN ACTION.
HIGHEST ECONOMY.

W. R. FLEMING & CO.
New York and New England.
NEW YORK OFFICE, Mail and Express Bldg.
BOSTON OFFICE, 620 Atlantic Ave.
(Walter W. Jones, Manager.)

SELLING AGENTS:

F. E. BAILEY, Philadelphia,
24 S. 7th St., Builders Exchange
H. E. BALDWIN, Cincinnati,
Ferrin Bldg, 5th and Race Sts.



ZUCKER & LEVETT CHEMICAL CO.,

10, 12 & 14 Grand Street,

New York, U. S. A.

NICKEL PLATING OUTFITS,

Dynamos and Motors for Light, Power and Electro-plating.

Send for Catalogue of

NICKEL AND ELECTRO-PLATING SUPPLIES AND POLISHING MATERIAL.

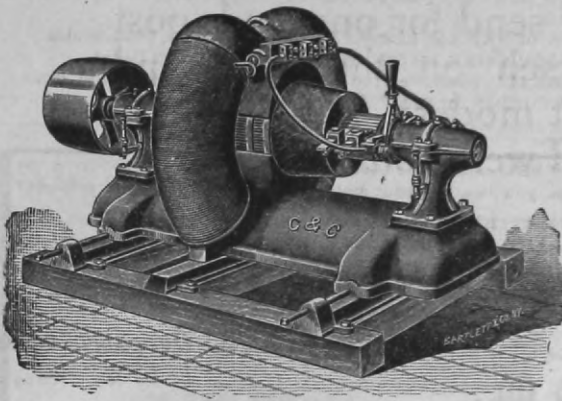
C. & C. ELECTRIC MOTORS AND DYNAMOS

Highest Electrical Efficiency.

Best Mechanical Construction.

Electric Pumps, Hoists, Fans, Blowers, Etc.

Large experience in and special attention paid to electrical transmission of power in factories.

**THE C. & C. ELECTRIC MOTOR CO.**

GENERAL OFFICES:

402 and 404 Greenwich St., New York.

BRANCH OFFICES:

CHICAGO,
201 Madison Street.BOSTON,
63 Oliver Street.

AGENCIES IN ALL PRINCIPAL CITIES.

ESTABLISHED 1820.

INCORPORATED 1891

The Hanson & Van Winkle Co.,

MANUFACTURERS OF

NICKEL AND ELECTRO PLATERS' MATERIAL.

Nickel-Plating Outfits

From \$20 upward.

DYNAMO-ELECTRO MACHINES

For all purposes.

The New H. & V. W. Dynamo Machine.

In sizes from No. 1 to No. 5.

FROM \$100 TO \$500.

These machines will be placed on 30 days' trial with responsible parties, and if not satisfactory may be returned at our expense. Guaranteed 30% more powerful than any machine in the market at same price.

219-221 Market St., Newark, N. J.

81 Liberty St., New York.

35-37 South Canal St., Chicago, Ill.

**WE FURNISH EVERYTHING.****CHAPMAN VALVE MFG. CO.**

Manufacturers of

VALVES & GATES

For Water, Steam, Gas, Ammonia, &c.

GATE FIRE HYDRANTS,

With and without independent outlets.



We make a specialty of Valves with Bronze seats for High Pressure steam.

Works and General Office,

INDIAN ORCHARD, MASS.

Treasurer's Office,

72 Kilby and 112 Milk Streets,

Boston, Mass.

Chicago Office, 24 West Lake St. New York Office 28 Platt Street.

DYNAMOS

—FOR—

Electro-Plating.

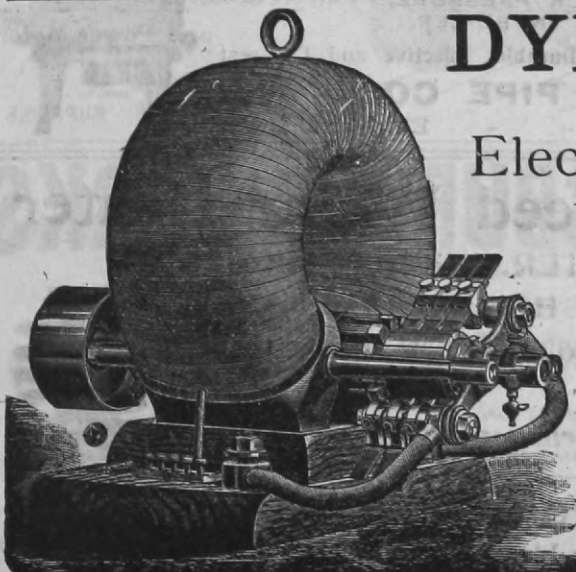
SIMPLE,

DURABLE and

EFFICIENT.

The Best Machine Made.
Satisfaction Guaranteed.

—THE—

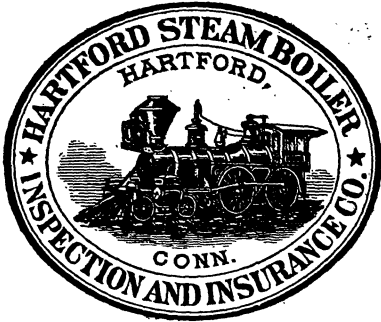
Eddy Electric Mfg. Co.
Windsor, Conn.**The Improved WHARTON-HARRISON SAFETY BOILER,**For all Power and Heating Purposes.
Single Boilers 2-240 H.-P.
Batteries of any Capacity.**THE COCHRANE FEEDWATER HEATER.****THE COCHRANE FEEDWATER HEATER & PURIFIER.**

THE COCHRANE

SEPARATOR.Horizontal or Vertical Form. For Obtaining
Dry Steam. Purified Exhaust.

MANUFACTURED BY

HARRISON SAFETY BOILER WORKS,
Germantown Junction. PHILADELPHIA, PA.



THOROUGH INSPECTIONS

And Insurance against loss or damage to property and loss of life and injury to persons caused by

Steam Boiler Explosions

J. M. ALLEN, Pres. WM. B. FRANKLIN, Vice-Pres. F. B. ALLEN, 2d Vice-Pres. J. B. PIERCE, Sec. and Treas

BOARD OF DIRECTORS:

J. M. ALLEN, President.
FRANK W. CHENEY, of Cheney Brothers Silk Manufacturing Co.
CHARLES M. BEACH, of Beach & Co.
DANIEL PHILLIPS, of Adams Express Company.
RICHARD W. H. JARVIS, President Colt's Fire Arms Manufacturing Co.
THOMAS O. ENDERS, of the United States Bank.
LEVERETT BRAINARD, of the Case, Lookwood & Brainard Co.
GEN. WM. B. FRANKLIN, late Vice-President Colt's Pat. Fire Arms Mfg. Co.
NELSON HOLLISTER, of the State Bank, Hartford.

HON. HENRY C. ROBINSON, Attorney at Law, Hartford.
HON. FRANCIS B. COOLEY, of the National Exchange Bank, Hartford, Conn.
A. W. JILLSON, late Vice-Prest. Phoenix Fire Insurance Co., Hartford, Conn.
EDMUND A. STEADMAN, President of the Fidelity Co., Hartford, Conn.
GEORGE BURNHAM, Baldwin Locomotive Works, Philadelphia.
HON. NATHANIEL SHIPMAN, Judge U. S. Circuit Court.
C. C. KIMBALL, Prest. Smythe Manufacturing Co., Hartford, Conn.
PHILIP CORBIN, of P. & F. Corbin, New Britain, Conn.

**HAVE YOU
EXHAUST STEAM?
GOING TO WASTE?**

Patentees, Proprietors and Manufacturers of the
Webster Vacuum Feed Water Heater and Purifier.
SEND FOR CATALOGUE.

Are your FEED WATER HEATERS obtaining the best results, in heating and purifying the feed water for your boilers? Are you heating your buildings with live steam or exhaust?

IF YOU DESIRE TO GET BETTER RESULTS from your present feed water heaters, and to heat your building by exhaust steam, without back pressure upon engines, saving power and water of condensation, together with **GREATER ECONOMY IN FUEL**, send for our catalogues of **Webster Vacuum Feed Water Heater and Purifier**, and **Williames Vacuum System of Steam Heating**, which contains some of the largest plants in the United States as references. We visit plants in any part of the United States, at our expense, furnish our apparatus, which may be attached to your present plant, upon trial, under guarantee.

WARREN WEBSTER & CO.,

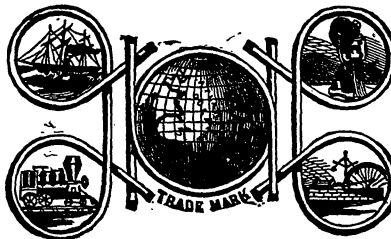
Managers and Sole Licensees for the Sale of Patent Rights in the United States.

Main Office and Works, Cor. Point and Elm Sts. Camden, N.J.

GLOBE PACKING.

FOR STEAM ENGINES, PISTON RODS
MINING PUMPS,
HYDRAULIC LIFTS, ICE MACHINES, ETC.

None genuine without this TRADE-MARK on the MUSLIN cover.

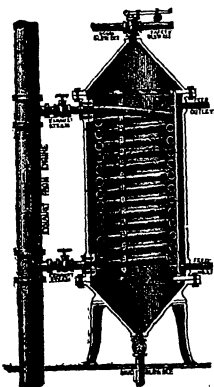


AGENCIES:

The Burnet Co., New York; W. D. Allen & Co., Chicago; Ensign & McGuffee, San Francisco; T. K. Carey & Bro., Baltimore; Charlotte Supply Co., Charlotte; Waters & Garland, Louisville; Southern R. & Supply Co., Richmond, and others

Ask your supply dealers for it or order from agents or from makers,

JAS. H. BILLINGTON & CO.
PHILADELPHIA, PA.



THE AMERICAN FEED WATER HEATER

Received the First Prize at the

Mechanics' Association Fair, - Boston, Mass.

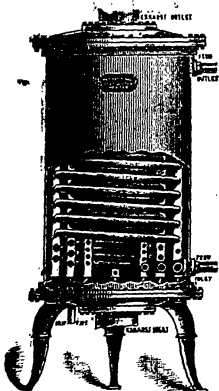
What you get when you buy the AMERICAN HEATERS:

COPPER COILS,	NO RUSTING OUT,
SOLIDLY BRAZED,	NO LEAKY JOINTS,
GUN METAL FITTINGS	NO TROUBLE FROM EXPANSION,
AND CLAMP STAYS,	NO BACK PRESSURE,
STEEL SHELLS,	NO OIL IN BOILER.

We guarantee this Heater to be the Most Durable, Effective and Cheapest.

WHITLOCK COIL PIPE CO.,

27 South Street, - - - Elmwood, Conn.



The National Feed Water Heater

is a BRASS COIL HEATER, delivering water to the boilers at 212° Fahrenheit. It is low in price, but unequalled in efficiency. 500,000 H. P. in daily use attests its merits.

Coils and Bends of Iron, Brass, and Copper Pipe.

THE NATIONAL PIPE BENDING CO.,

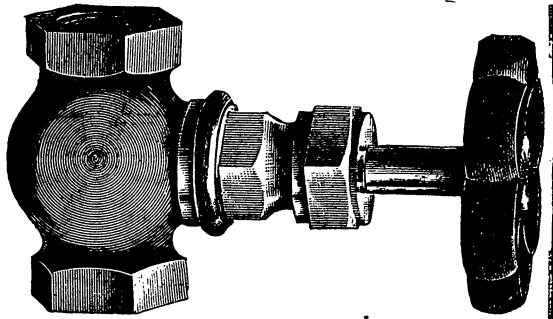
98 River St., New Haven, Conn.



**BLAST FURNACES,
ROLLING MILLS,
STEEL WORKS,
MINES, ETC.,
ETC.**



**OIL WELLS,
REFINERIES,
ELECTRIC LIGHT PLANTS
WATER WORKS, ETC.,
ETC.**



McNAB & HARLIN MFG. CO.,
—MANUFACTURERS OF—
BRASS COCKS AND VALVES
For Steam, Water and Gas.

Wrought Iron Pipe and Fittings. Plumbers' Materials. Seamless
Brass and Copper Tubes.

Factory, PATERSON, N. J.

56 JOHN ST., N. Y.

Catalogue and Price-List will be sent to the Trade with their first order, or by express, if desired, before ordering.



THE CONTINENTAL IRON WORKS

West and Calyer Streets, BROOKLYN, N. Y.,

—SOLE MANUFACTURERS OF—

**CORRUGATED FURNACES, FOR MARINE AND
LAND BOILERS.**

Made in sizes from 28 in. to 60 in. diameter, with flanged or plain ends.

Take Ferry from East 10th or 23d Streets, N. Y., to Greenpoint.

Thos. F. Rowland, Pres.
Thos. F. Rowland, Jr., Treas.

Warren E. Hill, Vice-Pres.
Chas. H. Corbett,

AUTOMATIC REGISTER.

The most accurate and reliable counter manu-
factured. Made entirely of metal.



Handsomely finished. Can be used on any
machine. Send for circular.

G. EDW. OSBORN & CO.,
391, 393 & 395 State St., New Haven, Conn

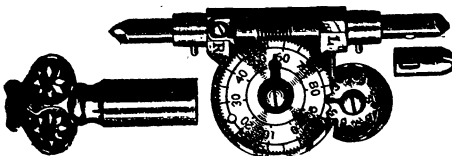
DURANT COUNTING MACHINES.



Send for
Catalogue
to

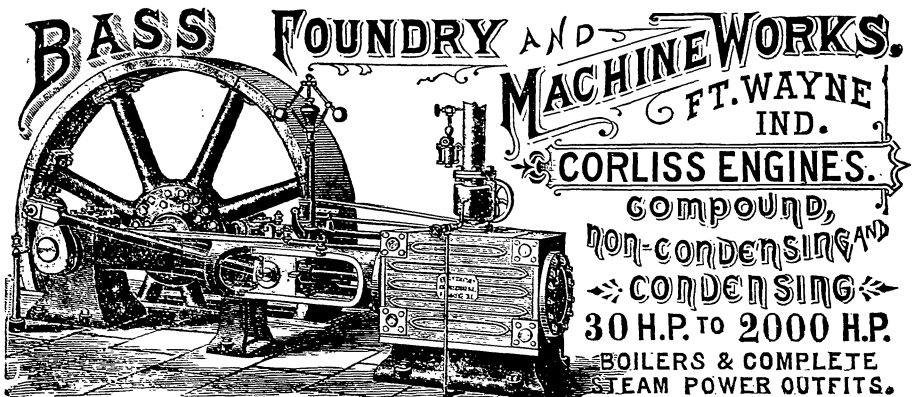
W. N. DURANT, 234 23d St., Milwaukee, Wis.,
Exhibit in Gallery, Manufactures Build-
ing, World's Columbian Exposition, Section
E, Col. T-108 and active exhibit in Machinery
Hall.

**CHURCH'S DOUBLE AND SINGLE
PEED INDICATORS.**

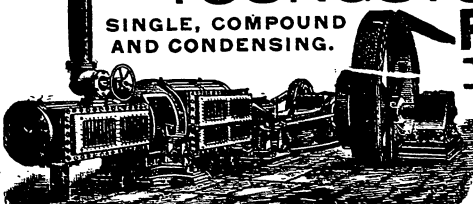


CHURCH & SLEIGHT, 109 FULTON ST., N. Y.

An Introduction to the Study of Metallurgy
By W. C. ROBERTS-AUSTEN, C. B., F. R. S.,
Associate of the Royal School of Mines, Chemist
and Assayer of the Royal Mint, Professor of Metal-
lurgy in the Royal College of Science, with which
the Royal School of Mines is incorporated. CON-
TENTS: Physical properties of metals; alloys; the
thermal treatment of metals; fuel; materials and
products of metallurgical processes; furnaces;
means of supplying air to furnaces; typical metal-
lurgical processes; economic considerations. With
numerous diagrams, 292 pages, cloth.....\$2.50
For sale by DAVID WILLIAMS, 96-102 Reade St., N. Y.



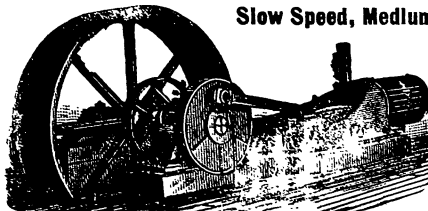
WILLIAM TOD & CO.
YOUNGSTOWN, OHIO.



**PORTER-HAMILTON
ENGINE**

Blowing Engines,
Hydraulic Cranes & Accumulators
Heavy Special Machinery.
ENGINE CATALOGUE ON APPLICATION.

THE BUCKEYE AUTOMATIC CUT-OFF ENGINES.
Slow Speed, Medium Speed and High Speed Engines.



Simple, Compound and Triple Expansion
Engines, High Pressure Boilers.

Complete Steam Power Plants of
Highest Attainable Efficiency.

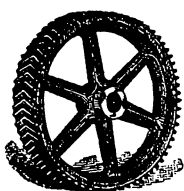
Address BUCKEYE ENGINE CO., Salem, Ohio

H. T. Porter, No. 10 T. B. B. Building, New York City. A. A. Hunting, John Hancock Building,
Boston, Mass. N. W. Robinson, 97 Washington St., Chicago. Robinson & Cary Co., St. Paul, Minn.
A. L. Fish, No. 61 First Street, San Francisco, Cal. A. M. Morse, 511 Commercial Building, St. Louis, Mo.

Bright Minds

make bright ventures and gain brilliant successes. They get out of the old and get into the new. That means they discard old fashioned gearing and use our MACHINE MOLDED gears, made from our SPECIAL PROCESS charcoal iron. Do you?

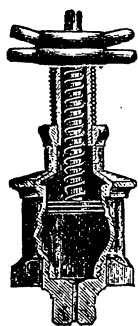
UNION FOUNDRY & MACHINE CO.,
Pittsburgh, Pa.



WADHAM'S OIL AND GREASE CO., Milwaukee, Wis.,

Manufacturers of

Fine Lubricants and Compression Grease Cups.



Sole manufacturers of the O'CONNELL GREASER. The most reliable lubricator in existence for the Crank Pin and Cross Head. It saves 50 per cent. of the cost of using oil and effectually prevents hot journals. Special cups made for upright MARINE ENGINES. Write for Descriptive Catalogue and Prices.

WELL MACH'Y

All Kinds, Water, Gas, Oil Mining, Ditching, Pumping, Wind and Steam; Heating Boilers, &c. Will pay you to send \$5c. for Encyclopedia of 1500 Engravings.

The American Well Works, Aurora, Ill.
Also Chicago, Ill.; Dallas, Tex.; Sydney, N. S. W.

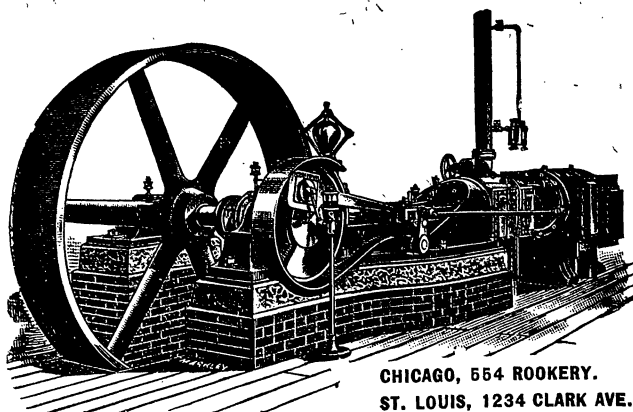
BOSTON GEAR WORKS

37 Hartford St., Boston, Mass.

HEADQUARTERS FOR GEARS.

Book on Gears, 170 Illustrations, \$1.00. Job Gear Cutting of all kinds. Spur, Bevel, Spiral, Hatchet, Worm, Rack, Elliptic, Index Plates, &c. Very small or large. Send for 1892 Catalogue; 900 sizes of Gears; FREE to any business firm.

ROLLASON GAS ENGINES
RELIABLE AND ECONOMICAL
Send for Catalogue, etc. HAVEMEYER BLDG. NEW YORK



SOUTHWARK FOUNDRY AND MACHINE CO.,

Philadelphia, Pa.

Sole Makers of

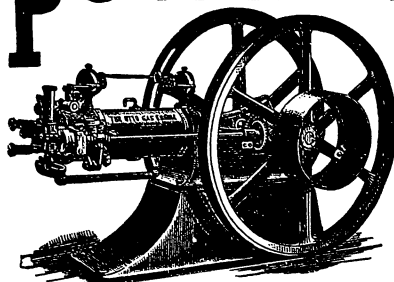
THE PORTER-ALLEN
AUTOMATIC ENGINE,
SIMPLE, COMPOUND
OR TRIPLE EXPANSION.

Also Builders of
BLOWING ENGINES,
REVERSING ENGINES,
CENTRIFUGAL PUMPS,
BOILERS, TANKS, ETC.

CHICAGO, 554 ROOKERY.
ST. LOUIS, 1234 CLARK AVE.

POWER FROM GASOLINE.

DIRECT FROM THE TANK.



CHEAPER THAN STEAM.

No Boiler. No Steam. No Engineer.

For Use Everywhere.

OTTO GASOLINE ENGINES,

Stationary or Portable.

1 to 50 H. P. 8 to 20 H. P.

Running Expenses, Less than one cent per horse power per hour.
For large engines, one-half cent per horse power per hour.

Suitable for all manufacturing purposes, Electric Lighting, Town Water Supply.

The Best Auxiliary Power for Night Work.

OTTO GAS ENGINE WORKS,

33d and Walnut Sts.,
PHILADELPHIA, PA.

CHICAGO OFFICE:
245 Lake St.

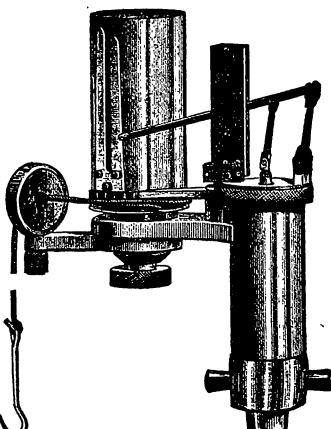
BOSTON OFFICE:
19 Pearl St.

E. L. MAXWELL, Pres. C. A. MOORE, Vice-Pres. H. S. MANNING, Treas. M. LUSCOMB, Sec.

THE ASHCROFT MANUFACTURING COMPANY

SOLE MANUFACTURERS OF

THE TABOR STEAM ENGINE INDICATOR.



The only instrument that will make accurate diagrams at either high or low speeds. In use all over the World where accuracy is desired. Approved and adopted by United States Government on the new Cruisers.

Use the Coffin Averaging Instrument; determines the area of any irregular figure. Gives mean effective pressure (M. E. P.) of an indicator diagram without computation. Absolute accuracy. Easy to manipulate. No liability to error. One diagram per minute measured without effort.

Also Steam and Vacuum Gauges, with Patent Seamless Drawn Tube, Steam Traps, Packer Ratchet Drills, Stanwood Cutters, Marine Clocks, Engine Revolution Counters, Test Gauges, Oil Cups, Test Pumps, Locomotive Spring Balances, Steam Whistles, Salinometers, and all instruments for Measuring Steam, Air, Gas, or Water.

Office and Salesroom, 111 Liberty St., N. Y.

Factory, Bridgeport, Conn.

Address all Letters to P. O. Box 3754, New York.

Exhibit at World's Columbian Exposition, Section No. 25 Columns K. 24 and 25, Main Center Aisle, Machinery Hall.

The Shipman Automatic Steam Engine.

PETROLEUM OR KEROSENE FUEL.

1, 2, 6, 8 Horse-Power, Single.
8 and 22 " " Compound.

STATIONARY or MARINE.

No SKILLED ENGINEER.

—SEND FOR CATALOGUE.—

SHIPMAN ENGINE CO.,

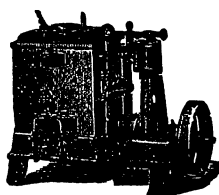
200 Summer St., Boston, Mass.

New Orleans

New York,

Chicago,

San Francisco.



Awarded the Grand Prize at Late Paris Exposition.

SEND FOR THIS BOOK
FREE ON APPLICATION.

THE BABCOCK & WILCOX CO. WATER TUBE

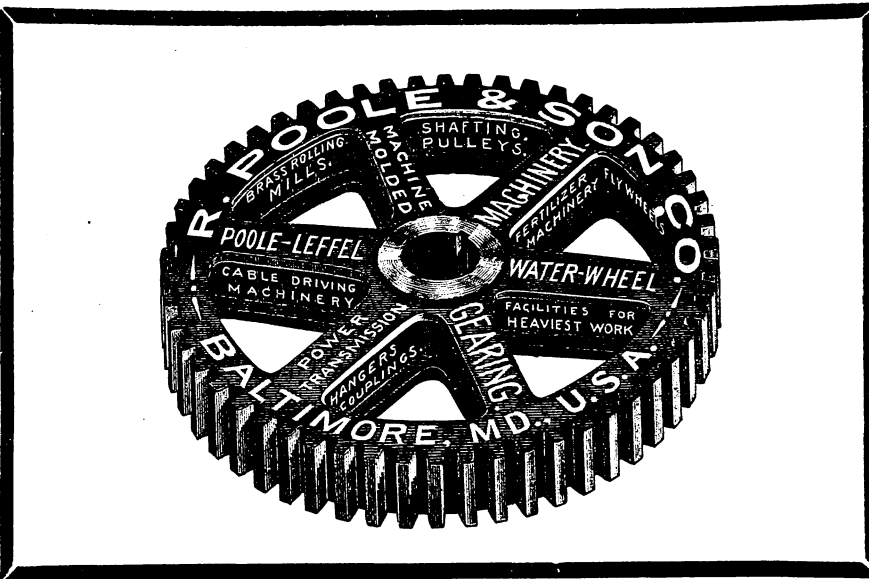
30 CORTLANDT ST. N.Y.

BRANCH OFFICES:

- BOSTON, MASS. 8 OLIVER ST.
- PHILADELPHIA, PA. 32 N. 5TH ST.
- PITTSBURGH, PA. 408 LEWIS BLOCK
- CLEVELAND, O. 412 PERRY-PAYNE BLDG.
- CHICAGO, ILL. 45 S. JEFFERSON ST.
- MINNEAPOLIS, MINN. 604 CORN EX.
- NEW ORLEANS, LA. 57 CARondelet ST.
- HAVANA, CUBA. 116 1/2 CALLE DEL ARCA.

STEAMBOILERS

MANUFACTORIES IN UNITED STATES, SCOTLAND, FRANCE, GERMANY & AUSTRIA.



ROCK DRILLING AND AIR COMPRESSING

MACHINERY

—FOR—

TUNNELS, QUARRIES,

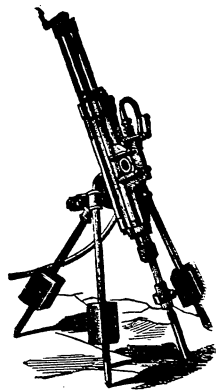
MINES, RAILROADS,

And wherever Ore and Rock are to be Drilled and Blasted.

RAND DRILL CO.,

23 Park Place, New York.

Branch Offices: Monadnock Building, Chicago; Ishpeming, Mich.; 1316 18th Street, Denver; Sherbrooke, P. Q., Canada; Apartado 830, Mexico City.



IRON CASTINGS of all kinds to order.

Drill Press and PLANER CHUCKS

UNIVERSAL PORTABLE RADIAL DRILLS. HIGH PRESSURE VERTICAL ENGINES. HORIZONTAL STATIONARY ENGINES.

CRANES, Hand and Power, Steam and Hydraulic.

Diamond Pointed Core PROSPECTING DRILLS.

Can Turn 22 Feet Diameter.

MACHINERY of all kinds built to order.

MINERAL LANDS PROSPECTED and Artesian Wells Bored, by Contract.

PENNSYLVANIA DIAMOND DRILL & MANUFACTURING CO. - BIRDSBORO, PA.

CHICAGO MACHINERY & ENGINEERING CO., Western Sales Agents. Chicago, Ill.

CLEVELAND & HARDWICK

ERIE ENGINE WORKS

MANUFACTURERS OF STEAM ENGINES and BOILERS.

ERIE, PENN.

The PHOENIX IRON WORKS COMPANY, Meadville, Pa., respectfully invites

YOU

to call and see their exhibit of "DICK & CHURCH" high speed engines, World's Columbian Exposition, Chicago, Ill., Machinery Department Building, Section C, Column No. 7.

One Single Cylinder Engine of 250 H.-P.
One Tandem Compound Engine of 250 H.-P.
One Triple Expansion Engine of 500 H.-P.

Books for Assayers

The Chemistry of Iron and Steel Making, and of their Practical Uses.

Written with the object of supplying to the producers and distributors of iron and steel, and to engineers, shipbuilders, architects and others concerned in the use of these important materials, the special scientific knowledge which they all should possess in simple, clear and readable language, the inevitable technicalities being explained as they occur. By U. MATTIEU WILLIAMS, F.C.S., F.R.A.S. Crown 8vo, cloth extra.....\$3

The Assayer's Manual.

An abridged treatise on the docimastic examination of ores and furnace and other artificial products. By BRUNO KERL; from the German by W. T. BRANNT; second American edition, edited, with additions, by F. LYNWOOD GARRISON; 354 pages, illustrated cloth.....\$3

Notes on the Chemistry of Iron.

For professional men, students, iron and steel merchants and all interested in iron. Explaining the methods of analysis, and how to apply the results obtained. Third edition, revised and enlarged. By MAGNUS TROLLRUS; 143 pages; cloth.....\$2

System of Quantitative Chemical Analysis.

Edited by PROF. O. D. ALLEN, assisted by PROF. S. W. JOHNSON. Revised and corrected by DR. C. R. FRESSENIUS; 883 pages; cloth.....\$6

Manual of Qualitative Chemical Analysis.

Translated into the new system and newly revised by Samuel W. Johnson, M. A. Ninth edition. By DR. C. R. FRESSENIUS. 500 pages; cloth.....\$4

Quantitative Chemical Analysis by Electrolysis According to Original Methods.

Authorized translation from the German of Dr. Alex. Classen. By PROF. WM. HALE HERRICK. Teaching electrolytic methods, useful in laboratories for research, and in technical laboratories, especially those connected with metallurgical works. Cloth \$2.50

The Blowpipe in Chemistry, Mineralogy, and Geology.

Containing all known methods of anhydrous analysis, many working examples, and instructions for making apparatus. By LIEUT.-COLONEL W. A. ROSS, R.A., F.G.S. With 120 illustrations; 214 pages; cloth.\$2

The Art of Electrolytic Separation of Metals.

Theoretical and Practical. By G. GORE. Fully illustrated; 8vo, cloth.....\$3.50

A Text Book of Assaying;

for the use of students, mine managers, assayers, &c. By J. J. and S. C. BERINGER; 400 page diagrams; cloth.....\$3.25

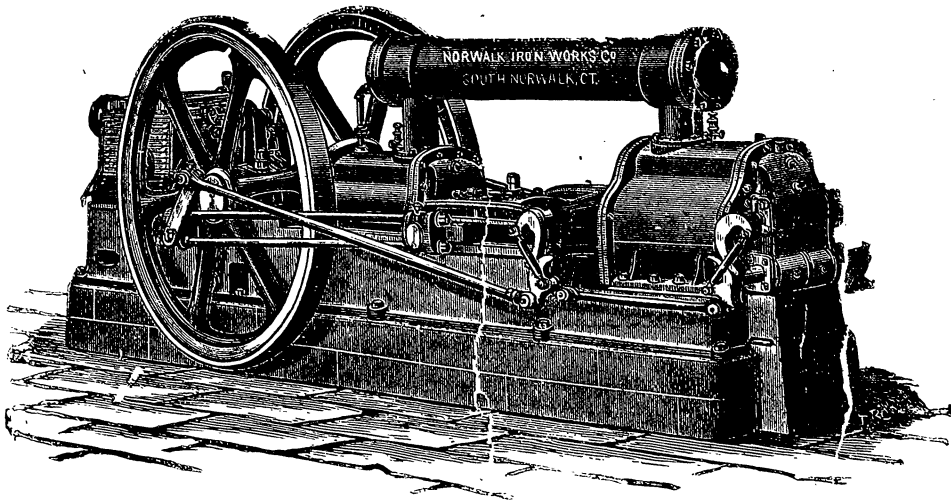
Exercises in Quantitative Chemical Analysis.

With a short treatise on gas analysis. By W. DITTMAR.....\$1.25

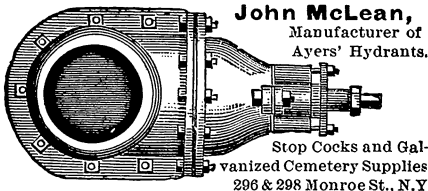
Any book published sent, postpaid, on receipt of price, by

DAVID WILLIAMS,
Publisher and Bookseller,
96-102 Reade Street, New York.

Air Compressors.



THE NORWALK IRON WORKS CO., South Norwalk, Conn.



John McLean,
Manufacturer of
Ayers' Hydrants.

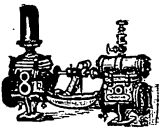
Stop Cocks and Gal-
vanized Cemetery Supplies
296 & 298 Monroe St., N.Y.



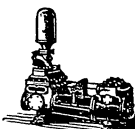
**CHEAPEST.
HANDIEST.
SIMPLEST.**

PUMPS.
Handling Dirty, Gritty and Sandy Liquids
without Wear, Oil or Care. Pumping outfit
for Contractors, Mining, Irrigating, Railroad
Quarry, Drainage and Manufacturing purposes.
Second-hand Engines, Boilers, Pumps, and
other Machinery always on hand. Exchanging

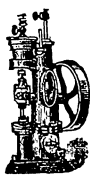
**MASLINS, 165-167 First St.
Jersey City, N.J.**



Send
for
Prices.



VALLEY PUMP CO.
Easthampton, Mass.



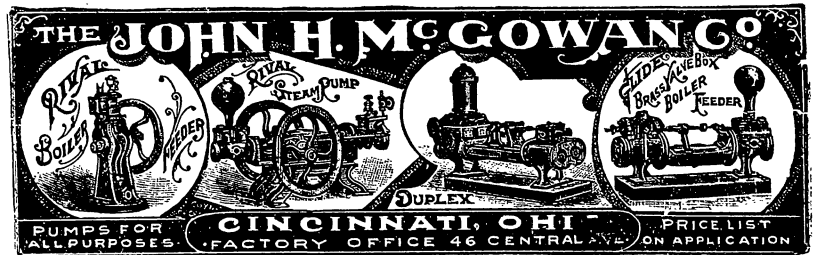
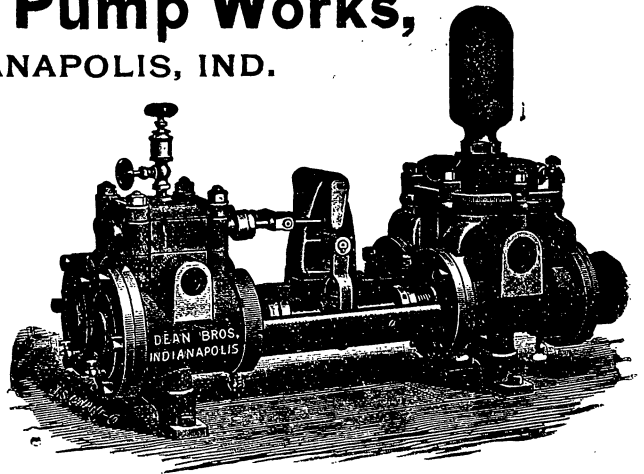
DEAN BROTHERS'
Steam Pump Works,
INDIANAPOLIS, IND.

DUPLIX PUMPS.

SINGLE PUMPS.

**DEEP WELL
PUMPS.**

Send for Catalogue
and Prices.



Brass Founders and Mfrs. of every description of Brass and Iron body goods for steam, gas and water.

Worthington Steam Pumps
CONDENSERS and WATER METERS.

HENRY R. WORTHINGTON,

86 & 88 LIBERTY STREET, NEW YORK.

BOSTON,

ST. LOUIS,

PHILADELPHIA,

DENVER.

CHICAGO.

The WATERBURY-FARREL POUNDRY & MACHINE CO., Waterbury, Connecticut.

Builders of Rolling Mill Machinery, Special Machines for finishing and making goods from
Sheet Brass, Copper, Steel Silver, &c., **POWER PRESSES, HYDRAULIC PRESSES,**
Drop Presses, Foot Presses, **RIVET MACHINES,** Gang Slitters, Grinding Machines, Steel
Rolls, Wire Mill Machinery, Tube Drawing Machinery, Dies, &c.

**SEAMLESS
COPPER FLOATS
AND**

AIR CHAMBERS. Made in all sizes
and shapes by a
New
Process.
Guaranteed
to stand 50%
more pressure than any other make.
SEND FOR PRICES.

**SPRINGFIELD BRASS CO.,
SPRINGFIELD, MASS.**

The Brown Hoisting and Conveying Machine Co.,

CLEVELAND, OHIO, U. S. A.,

Sole manufacturers of the

"BROWN HOIST"

A NEW AND COMPLETE SYSTEM FOR HANDLING OF MATERIALS.

The Brown Patent Cable Tramway system.

The Brown Patent Suspended Beam Tramway system.

The Brown Patent Bridge Tramway system.

The Brown Patent Shed Tramway system.

The Brown Patent Furnace Stock Distributer.

The Brown Patent Warehouse Tramway system.

The Brown Patent Sewer Machine Tramway system.

The Brown Patent Continuous Elevated Tramway system.

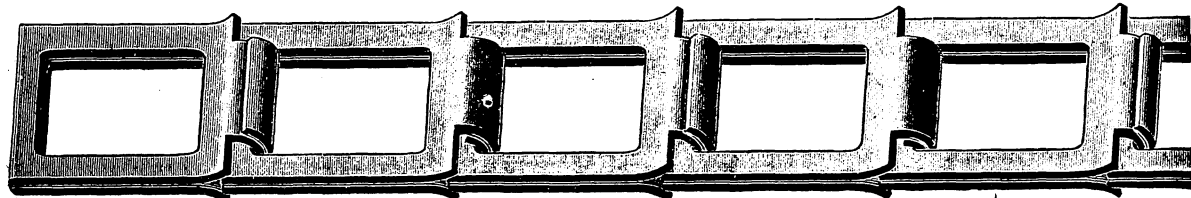
The Fayette-Brown Patent Automatic Furnace Hoist.

The Brown Patent Friction Clutch Hoisting Engine.

Self-Dumping Buckets, Skip Cars, Friction Clutches, etc.

The Most Perfect Clutch.

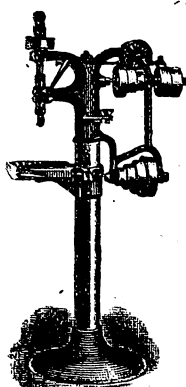
ROBERTS MFG. CO. - - - PITTSBURGH, PA.



PATENT DETACHABLE STEEL LINK BELTING,

Sprocket Wheels and Shafting.

Send for Catalogue and reduced Price-List



The Norton Drills

for light, sensitive and rapid drilling. 1, 2, 3, 4 or more spindles, sensitive or automatic feed. To drill from 0 to 1/2 inch holes. The latest and best. Most convenient, sensitive and durable drills on the market. Have balanced spindles and balanced tables. Write for prices and description, or for special machinery.

THE

NORTON & JONES MACHINE TOOL WORKS,
PLAINVILLE, CONN.

JEFFREY CHAIN BELTING.

Also MALLEABLE, WROUGHT, STEEL AND SPECIAL CHAINS for

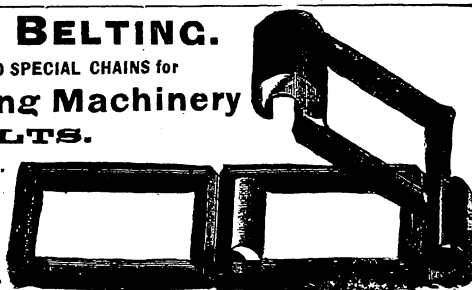
Elevating and Conveying Machinery
DRIVE BELTS.

Send for 1893 Catalogue and Reduced Price-List.

THE JEFFREY MANUFACTURING CO.

COLUMBUS, OHIO, U. S. A.

New York Branch, 163 Washington St.



PIPE

FROM 1-8 TO

24 in. Diameter

**CUT,
BENT,**

FITTED and ERECTED
Anywhere in the U.S.

BEST, FOX & CO.,

25th & Railroad Sts.,

Pittsburgh, Pa.

ALEXANDER BROS.

BEST OAK BELTING.

PHILADELPHIA.

GOULDS PUMPS

Are Better

OUR
Triplex Electric Pumps

afford constant and uniform water supply for operating Hydraulic Elevators on either open or closed Tank Systems.

Clean and noiseless in operation.
Efficient or economical in service.
Automatic in control.

Send for Catalogue "Efficient Power Pumps and their applications."

The Goulds Manufacturing Co.,
Manufacturers of Pumps and Hydraulic Machinery,
Factory: Seneca Falls, N.Y., U.S.A. Warerooms: 16 Murray St., New York City.



LEVIATHAN BELTING.



Positively unequalled for Strength, Durability and Traction Power; unaffected by Heat, Steam or Water.

Belts for Main Driving and work of a heavy nature a specialty.

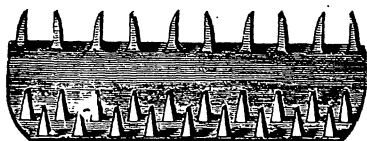
MAIN BELTING COMPANY,

Sole Manufacturers,
1219-1235 Carpenter St.,
PHILADELPHIA.

248 Randolph Street, Chicago.
120 Pearl Street, Boston.

Send for Price-Lists and Samples.

Talcott's Combination Belt Hooks

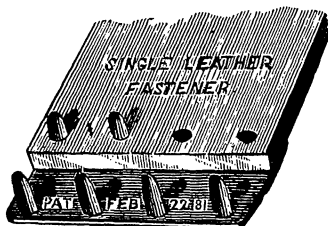


W. O. TALCOTT, Providence, R. I.

MANUFACTURER OF

Four Styles of BELT HOOKS, including 134 Sizes.
SEND FOR CATALOGUE.

Thacher's Patent BELT FASTENERS.



Manufactured by

The Claffen Manufacturing Co., Cleveland, O.
Office, 71 and 73 Ontario St.

FOR THE
"Double Triple Quick Stroke"
SHAPER
WRITE TO
GOULD & EBERHARDT, Newark, N.J.



12 in., 16 in. 20 in., 24 in., 28 in. 30 in. stroke.

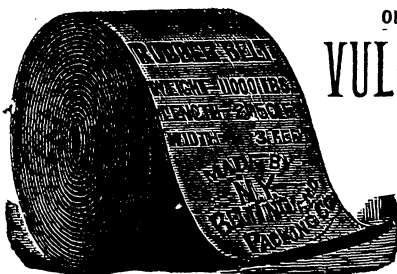
NEW YORK BELTING & PACKING CO. LTD

JOHN H. CHEEVER,
President.

15 Park Row, New York.

Oldest and Largest Manufacturers in the U. S. of

VULCANIZED RUBBER FABRICS



For Mechanical Purposes.

MACHINE BELTING

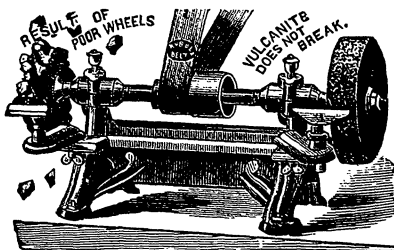
With Smooth Metallic Rubber Surface.



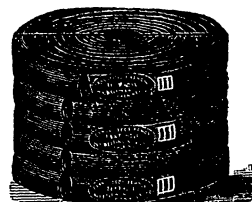
RUBBER TEST HOSE

COTTON "CABLE" HOSE, CIRCULAR, WOVEN, SEAMLESS, ANTISEPTIC

For the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories and Steamers.



Rubber Cement.



THE ORIGINAL SOLID VULCANITE EMERY WHEELS.

RUN EASY and SAFE, COOL and TRUE. ARE MORE DURABLE—HENCE CHEAPER. A trial will convince you of this. KNIFE GRINDING WHEELS A SPECIALTY.

Rubber Goods to Order for all Mechanical Purposes.

SALESROOMS:

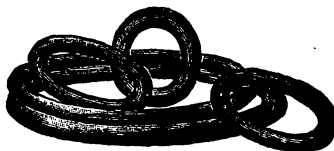
PHILADELPHIA, 308 Chestnut St.
BOSTON, 44 Summer St.
CHICAGO, 151 Lake St.
DENVER, 1601-1611 17th St.
CHARLESTON, 160 Meeting St.
CINCINNATI, 227 West 4th St.
MINNEAPOLIS, 200 1st Ave South.
CLEVELAND, 176 Superior St.

SALESROOMS:

SAN FRANCISCO, 17 Main St.
DETROIT, 16-20 Woodward Ave.
BALTIMORE, 12 N. Charles St.
NEW ORLEANS, 8-12 N. Peters St.
KANSAS CITY, 1311 and 1313 W. 12th St.
ST. LOUIS, 616 Locust St.
DALLAS, 173 Elm St.

H. O. CANFIELD,

MOULDED BRIDGEPORT, CONN.

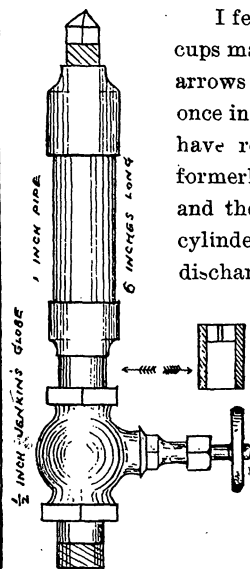


RUBBER GOODS FOR MECHANICAL PURPOSES.

Small moulded work a specialty. Send for estimates for moulds and work.

An Experienced Engineer's Manner of Using

Dixon's Lubricating Graphite.



I feed Dixon's pure flake graphite into the steam chest with cups made from piping, as per sketch. In the nipple indicated by arrows I drive in a brass plug and drill a $\frac{1}{16}$ in. hole. I fill the cup once in three days and the steam takes care of the graphite. I have reduced the feed of cylinder oil one-half of the amount formerly used. I put one cup on each high pressure steam chest and the exhaust carries the graphite over into the low pressure cylinder and over into the air pump. It is used three times and discharged into the river. It is not worth trying to save it to use

over, as I have heard some say they do. I hope engineers generally will make themselves better acquainted with graphite and learn the difference between Dixon's pure flake graphite and the ordinary commercial plum-bago.

FRANK Y. FISHER,

Engineer Pumping Station, Dover Water Works,
Dover, N. H.

For sample and descriptive pamphlet address

JOS. DIXON CRUCIBLE CO.,
JERSEY CITY, N. J.

E. W. BLISS CO.,

11 ADAMS STREET,
BROOKLYN, N. Y.

WESTERN OFFICE:

14 N. CANAL STREET, - CHICAGO, ILL.

No. 157.

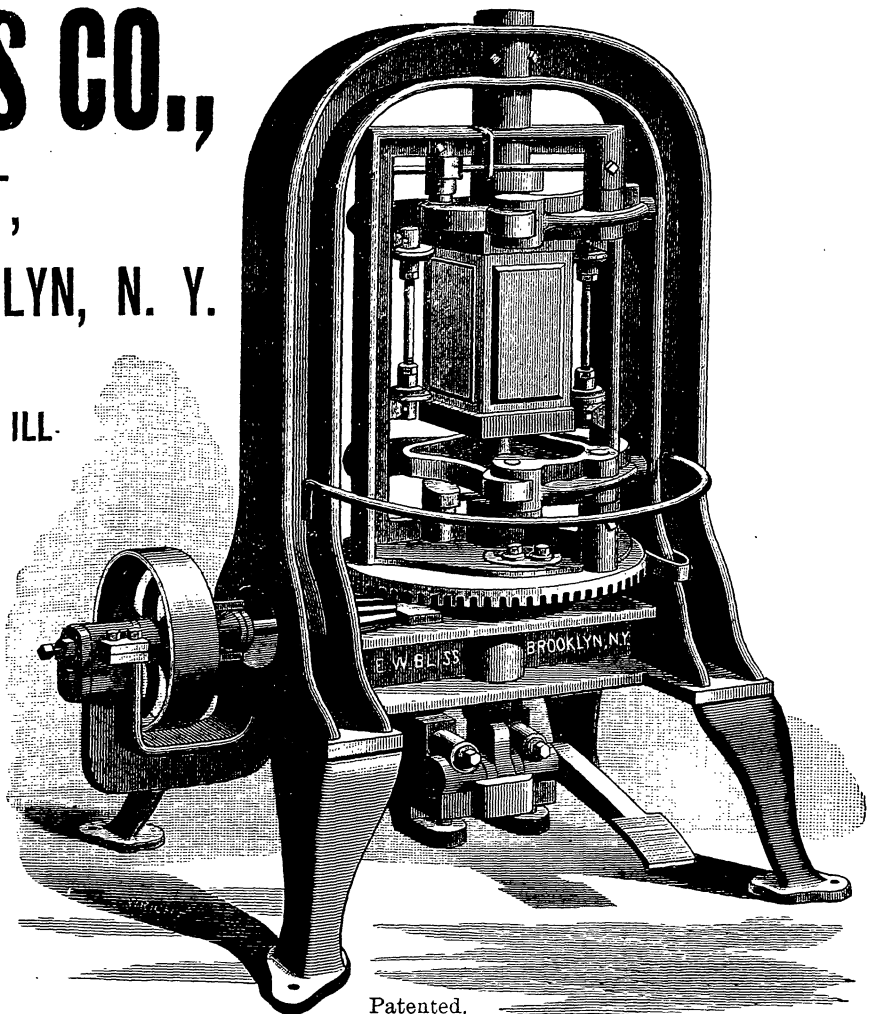
Machine for Rolling
Seams
of Square Cans.

Write for Particulars.

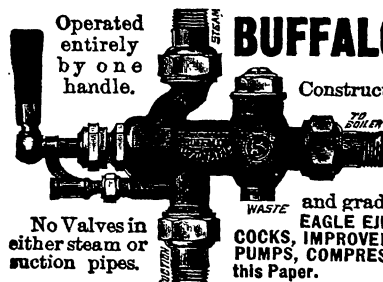
Presses, Drop-Hammers,
Dies.

Owners of

THE STILES & PARKER PRESS CO.



Patented.



BUFFALO AUTOMATIC INJECTOR

A GRADING INJECTOR.

Construction and operation is such that water supply is always in proportion to supply of steam admitted and can be graded to feed continuously with steam from 20 to 140 pounds. Works perfectly whether lifting or taking supply from city pressure. Operated entirely by one handle, both in stopping and starting and grading supply of steam and water.

EAGLE EJECTORS, DUPLEX FLUE SCRAPERS, FELTSCHEN GAUGE COCKS, IMPROVED GLASS OIL CUPS AND LUBRICATORS, CYLINDER OIL PUMPS, COMPRESSION GREASE CUPS, Etc. Send for Catalogue. Mention this Paper.

SHERWOOD MFG. CO., Buffalo, N. Y.

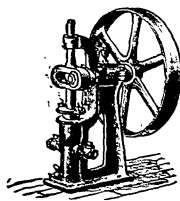
EUROPEAN AGENTS, Green & Boulding, 21 Featherstone St., London, E. C.

POWER BOILER FEED PUMP.

From 2 to 80 horse-power. Neat in design. Self-contained easy motion. Durable and reliable. Strong built, large bearings.

Send for Catalogue and Prices and mention this paper.

C. O. LUCAS & CO., Greenville, Ohio.



MORTON MANUFACTURING CO.,

MUSKEGON HEIGHTS, MICH., U. S. A.

BUILDERS OF

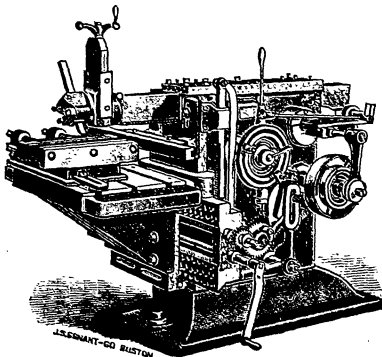
Morton's Patented Reversible Universal Shaper.

Morton's Lightning Keyway Cutter with Key Making Attachment.

Portable Keyway Cutters.

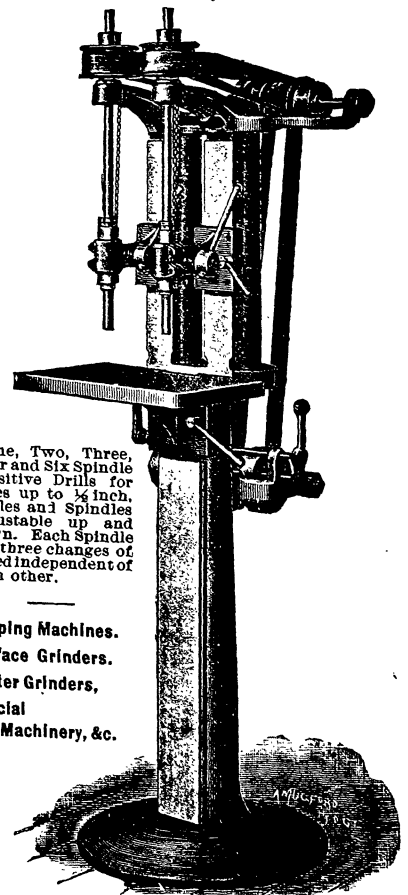
Portable Planers and Special Machinery.

These machines may be seen in operation at the World's Columbian Exposition, Section 28, Column K45, Machinery Hall annex. Write for description and prices. Mention this paper.



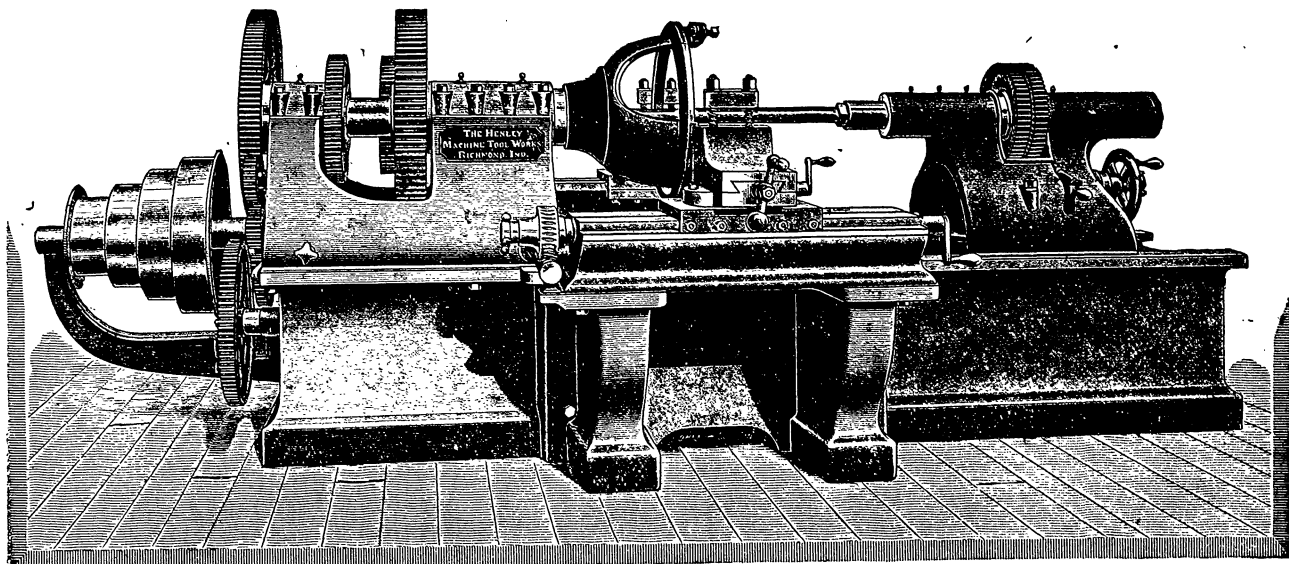
Woodward & Rogers,

HARTFORD, CONN.



Tapping Machines.
Surface Grinders.
Cutter Grinders,
Special
Machinery, &c.

PULLEY LATHES



Patented Feb. 17, 1891 ; June 14, 1887.

This cut represents the 42-inch Lathe. The 60-inch Lathe is of same design, but much heavier throughout. The 80-inch Lathe is of same general construction, with the bed supported on feet at each end.

These Lathes are especially designed for Simultaneously Boring and Turning Pulleys, both straight and crowning face, Cone Pulleys, Gear Blanks, and a variety of other work.

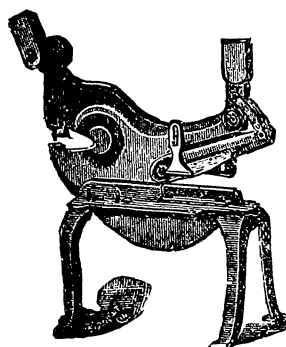
MANUFACTURED BY

THE HENLEY MACHINE TOOL WORKS, Richmond, Indiana.

A FEW GOOD MACHINES,

MADE BY

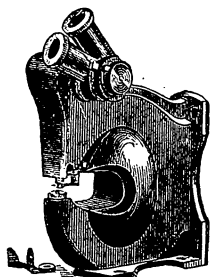
BERTSCH & CO.,
CAMBRIDGE CITY, IND.,



Who will quote price on any tool desired and can make almost anything you need.

Improved Pat. Combined Punch and Stock Shears. (7) different sizes from 200 to 1000 lbs. for light or heavy work, 6 to 15 in. throat punch. A general purpose tool adapted for punching and cutting bar and sheet iron as desired. Also make a similar Punch or Stock Shear separate, Power Punches, Improved Pat. Slip Roll Formers, Plate Straightening Rolls, &c. Labor-saving Machines for working Sheet Metal.

SEE THIS SPACE NEXT ISSUE.

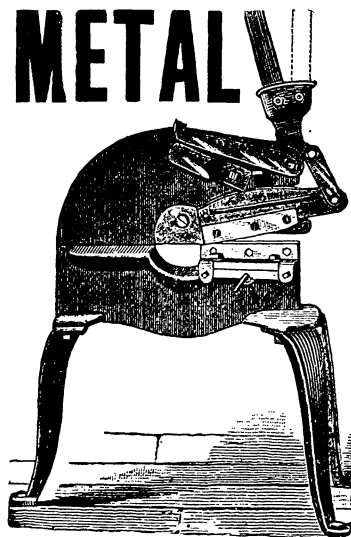


General Purpose Punches. powerful & Substantial.



New Patent Quick Adjustable Slip Roll Formers. A revolution in quickness and ease of adjustments, and opening the roll in one operation in elevated position as shown to remove the metal. All sizes from 2 in. to 12 in. rolls for large plates. Also similar Crimping or Corrugating Rolls, Improved Plate Straightening Rolls and Tools for working Sheet Metal. Notice this space next week.

METAL WORKING MACHINES

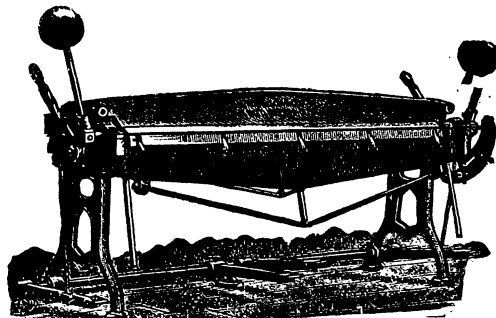


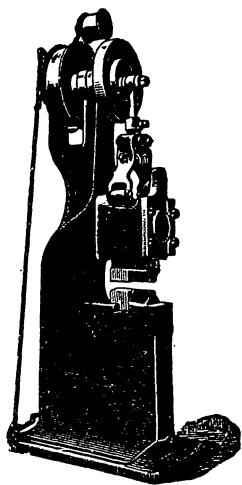
For straightening, cutting or forming bar and sheet metal into any desired shape or size. Presses, Dies, Punches and Shears. Also makers of the celebrated Globe Cornice Brakes.

WRITE FOR CATALOGUE AND PRICE.

50, 52, 54, 56 CENTRAL AVE.

J. M. ROBINSON & CO., Cincinnati, Ohio.





The Dupont Power Hammer.

The following users of this Hammer can testify to its merits:

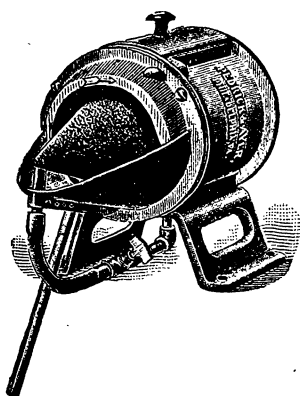
E. & T. Fairbanks & Co.'s Scale Factory; Miller & Ryan's Carriage Works, St. Johnsbury, Vt.; Stark Mill Co., Manchester, N. H.; Bemis & Call, Springfield, Mass.; The Thomas Laughlin Co., Portland, Me.; Burlington Woolen Co.; Edwards, Stevens & Co., Winooski, Vt.; Amory Manufacturing Co., Manchester, N. H.; Prentice Bros., Worcester, Mass.

The above are only a few of the many who have expressed satisfaction with the Hammer.

MADE IN SIZES FROM 25 TO 500 LBS. WEIGHT OF HEAD AND DIE.

DUPONT MANUFACTURING COMPANY.

ST. JOHNSBURY, VT.

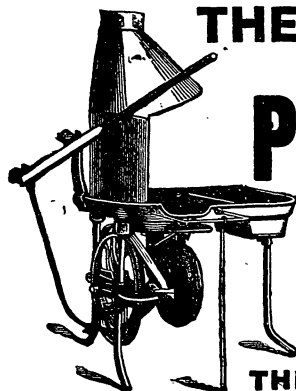


PATENT CENTRIFUGAL GRINDING MACHINE.

This cut shows our Gouge and Cutter Grinder. It is designed for grinding inside gouges, cutters and tools having concave cutting edges, and will grind all such tools to a true arc of a circle within its limits. It will be found more serviceable and effective than a whole gang of wheels mounted in the ordinary way. It supplies itself continuously with an abundant amount of water. It is guaranteed to do accurate work without drawing temper. Circulars and prices on application.

PEDRICK & AYER,

Philadelphia, Pa.

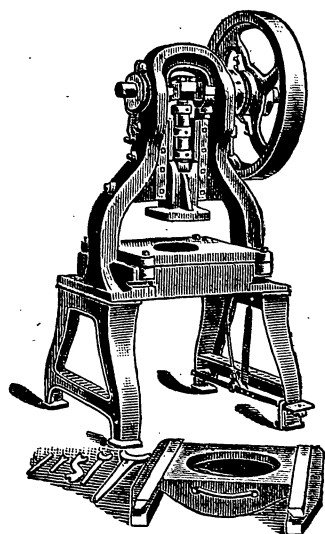


THE CYCLONE PORTABLE FORGES

Have Double Ratchet, Solid Frame, Adjustable Legs, Detachable Lever. Run Lightest, Make Strongest Blast & Last Longest. ALL DESIRABLE STYLES AND SIZES.

Sold by Hardware and Machinery Dealers everywhere. Send for Catalogue of these and

Hand & Power Blower, Blacksmith Drill Presses, &c.
THE FOOS MFG. CO. SPRINGFIELD, OHIO.



Presses, Dies, Presses,

OF ALL KINDS FOR

Sheet Metal Ware.

Difficult and Intricate Drawing
Stamping, Embossing, Wiring,
Blanking and Combination
Dies a Specialty.

SUBMIT SAMPLES AND WRITE FOR PRICES.

Stark Machine & Tool Co.,

BUFFALO, N. Y.

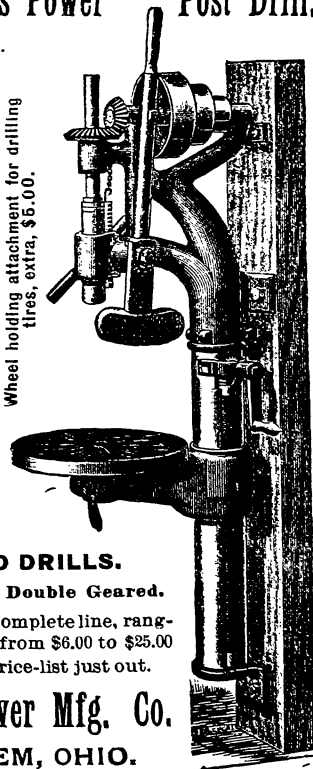
Send for Catalogue and mention "The Iron Age."

Silver's Power Post Drill.

FIG. 727.

Has CUT GEARS, and is a thoroughly first class tool in all respects. 1 1/2 in. Column, 1/2 in. Dia. Spindle, 1 3/16 in., and bored No. 2 Morse Taper; Vertical Travel, 6 in.; Drills to centre 19 in. circle.

Weight, 325 lbs.; Price, \$60.00
Wheel holding attachment for drilling tires, extra, \$5.00.



HAND DRILLS.

Single and Double Geared.

Large and complete line, ranging in price from \$6.00 to \$25.00 list. New price-list just out.

The Silver Mfg. Co.

SALEM, OHIO.



J. POPPING'S

Patent

Machine & Tool Wks.

MANUFACTURERS OF

Solid Iron Shoulder Rabbet Planes, etc., etc. and Hofstatter's Patent Hair Picking machine.

N. E. Cor. 58 St. and 11th Ave., N. Y.

FOR TESTING IRON AND STEEL SPECIMENS, CAR COUPLERS, BRAKE SHOES, CHAIN, SPRINGS, WIRE, CEMENT

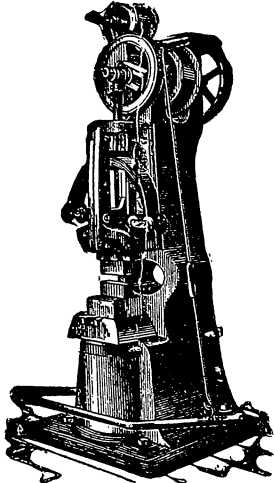
RIEHLE TESTING MACHINES,

Hydraulic Pumps and Presses, Robie Jacks, Marble Machinery, Iron Founders & Machinists, Riehle Bros. Testing Machine Co., 9th St. abv. Master, Phil

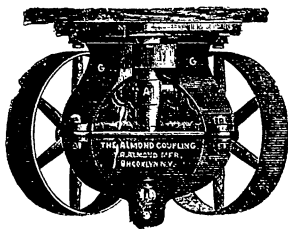
If You Use Power Hammers

Write to us for Circulars.

BELDEN MACHINE CO
NEW HAVEN, CONN.



Chicago Office, 65 South Canal Street.



THIS CUT REPRESENTS

ALMOND'S PAT. QUARTER-TURN COUPLING

To Replace Mule Pulleys and Bevel Gears.

It is a noiseless quarter-turn countershaft, self-contained, perfectly lubricated, and gives no trouble. Send for particulars.

T. R. ALMOND, 83 and 85 Washington Street, Brooklyn, N. Y.



BARNES' UPRIGHT DRILLS.

Complete line, ranging from our New Friction Disk Drill, for light work, to 42-inch Back Geared Self Feed Drill.

Send for Catalogue and Prices.

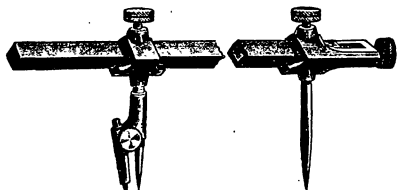
W. F. & JOHN BARNES CO.

69 Ruby St., Rockford, Ill.

ENGLISH AGENTS, CHAS. CHURCHILL & CO.

2 Cross St., Finsbury, London. E. C.

Trammel for Patternmakers and Draughtsmen.



The beam is made from square brass tubing, and is very light. The points are made from the best tool steel and hardened. It also has a pencil attachment, which after placing in the same radius as the steel point can be changed from one radius to the other without changing the relation of one to the other. Trammel with pencil point \$1.50. We also furnish an extension of 14 inches with clamp at 75 cents.

HURLEY BROTHERS, Hartford, Ct.

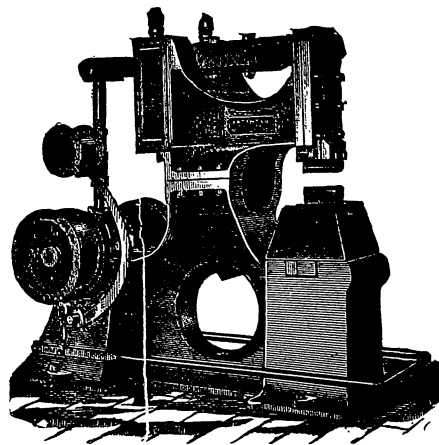
Makers of Fine Tools.

LINK-BELT

ENGINEERING CO
NICETOWN,
PHILA.
49 DEY ST.
NEW YORK

Elevators, Conveyors, Manila Rope Power Transmission Machinery, Ewart Detachable Link Belting, Dodge Chain, Howe Chain, &c. Western connection.
[CHICAGO,] LINK BELT MACHINERY CO.

JENKINS' POWER HAMMERS.



Adjustable and elastic stroke, nicety of regulation, efficiency of action, simplicity and durability of construction and the absence of leather straps, steel springs and all complication, combine to make this hammer the favorite wherever used.

JENKINS & LINGLE,
BELLEFONTE, PA.

PITTSBURGH MFG. CO.,

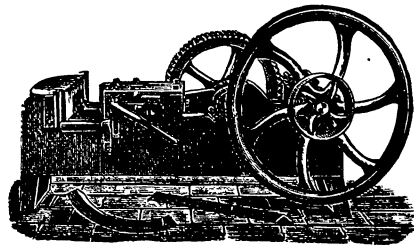
Manufacturers of

Crosgrove's Patent Straightening, Bending and Punching Machines.

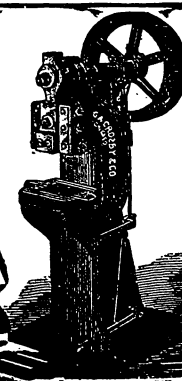
NAIL MACHINERY.

Bolts, Nuts, Rivets, Castings, &c.

PITTSBURGH . . . PA.

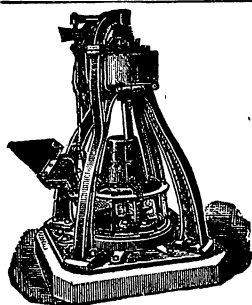


GA. CROS
Manufacture
PRESSE
SPECIAL MA
SHEET METAL
176 178 So. Clinton



BY CO.
s of
S. DIES
CHINERY
WORKERS
Sr., Chicago, Ill.

THE GRIFFIN MILL



A perfect pulverizer of all refractory substances by either the wet or dry process. It works better and at less expense than any other Mill, and is conceded to be the only perfect pulverizing Mill manufactured.

For free illustrated pamphlet address

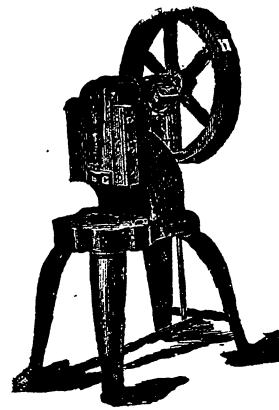
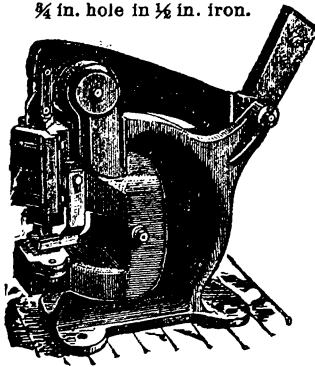
BRADLEY FERTILIZER CO., 92 State St., Boston.

Hand Punches and Shears

For Round, Flat, Square and Corrugated Iron.

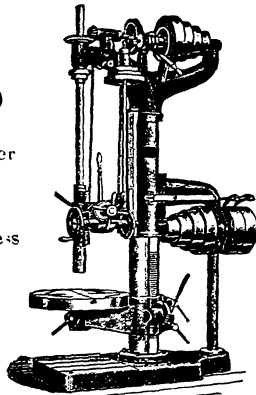
Portable Hydraulic Beam Punches,
(1 inch hole in 1 inch iron.)**Polishing and Buffing Machinery,****IMPROVED HYDRAULIC JACKS,** to raise
from 4 to 150 Tons.Hydraulic Presses, all styles; Hydraulic Hand and Power
Pumps; Accumulators, &c.**WATSON & STILLMAN,**

204, 206, 208, 210 E. 43d Street. New York.

 $\frac{3}{4}$ in. hole in $\frac{1}{2}$ in. iron.A. H. MERRIMAN,
MERRIDEN, CONN.**PRESSES.**
Catalogue and prices sent on application.**Machinists**Do better work, more satisfactorily, at less cost, and with greater
rapidity when using proper tools.**NO SHOP**is complete without a perfect and practically designed Drill Press
such as ours.**THE HAMILTON MACHINE TOOL COMPANY,**

WEST MARKET STREET,

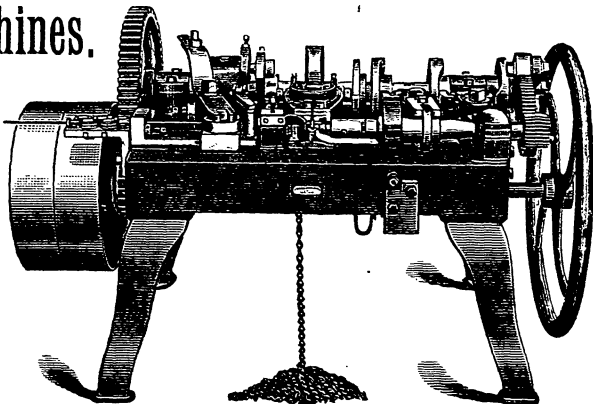
Hamilton, - Ohio, U. S. A.

**Jack Chain Machines.**FOR BOTH DOUBLE AND
SINGLE LINKS.Entirely automatic,
taking the wire directly
from the coil and com-
pleting chain at the rate
of 120 links per minute.

Send for prices.

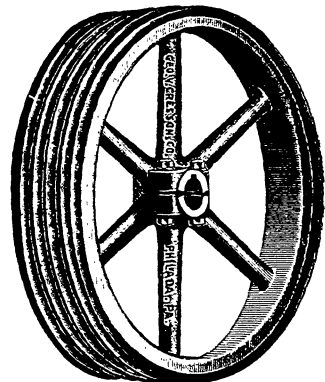
**CROSS & SPIERS MACHINE
CO.**

Waterbury, Conn.

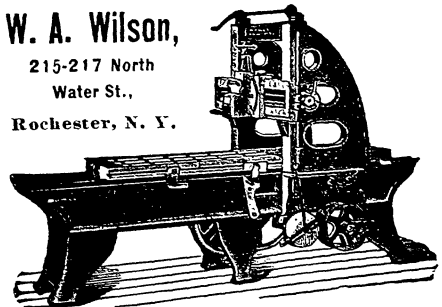
**GEO. V. CRESSON CO.,**

18th STREET AND ALLEGHENY AVE.

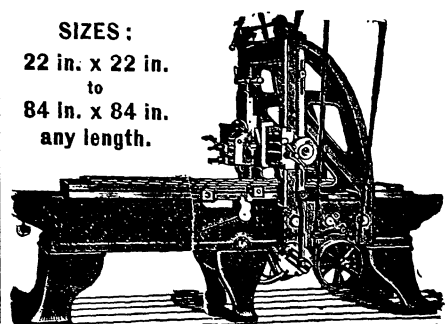
PHILADELPHIA, PA.

**ROPE WHEELS,**All Diameters and Number of
Grooves, for Manilla, Hemp,
Cotton, or Leather Ropes.**W. A. Wilson,**215-217 North
Water St.,

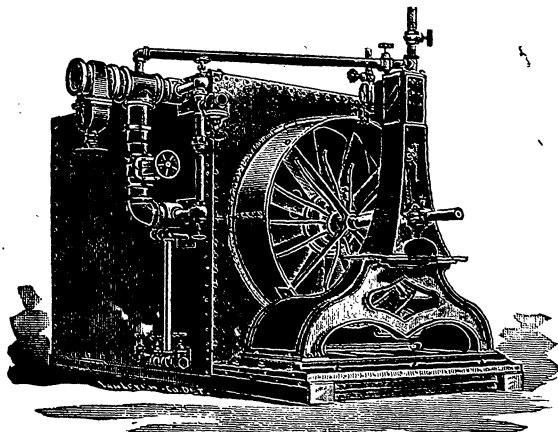
Rochester, N. Y.

Improved Iron Planers a specialty. 20 x 20, 22 x 22,
24 x 24 up to 42 x 42, to plane any length. Send for
description and price-list before purchasing. Manu-
facturers' agent for other tools and machinery. Men-
tion *The Iron Age*.**THE POWELL PLANER CO.**

SIZES:

22 in. x 22 in.
to
84 in. x 84 in.
any length.

WORCESTER, MASS.

For Heating
Schools,
Churches,
Factories,
Stores,
Machine and
Railroad ShopsBoston,
Chicago,
New York.**HUYETT & SMITH MFG. CO.,** DETROIT, MICH.**THE LANE & BODLEY CO.,**

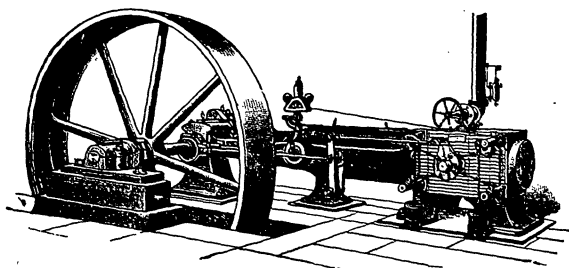
Cincinnati, O.

ENGINES,

ALL SIZES

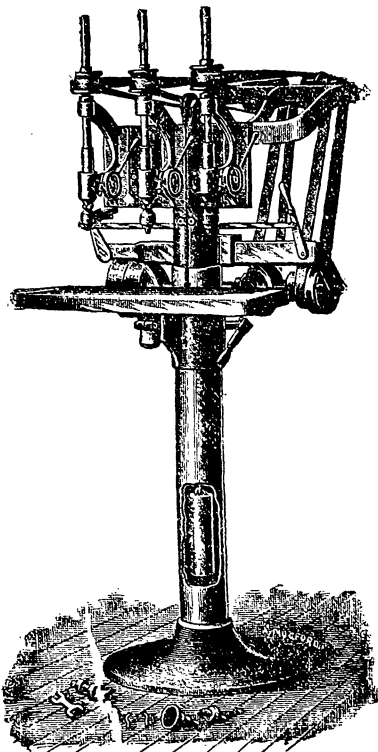
Simple and Compound,
CORLISS ENGINES A SPECIALTY.

Heavy Slide Valve Engines.

Shafting, Hangers, Pulleys,
Belt Elevator, etc.

SIGOURNEY DRILLS.

IMPROVED



Sensitive, Strong and Interchangeable

One, Two and Three Spindles.

Counter-balanced Spindles and Tables. Vertical range of table, 30 inches, and it will swing to right or left.

SEND FOR CIRCULAR.

THE SIGOURNEY TOOL CO.,
 Hartford, Conn.
**MACHINISTS' SCALES**

PATENT END GRADUATION.

Liberal Discount to the Trade. Send for List.

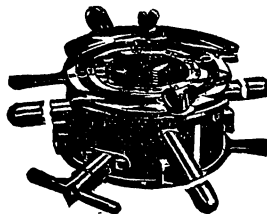
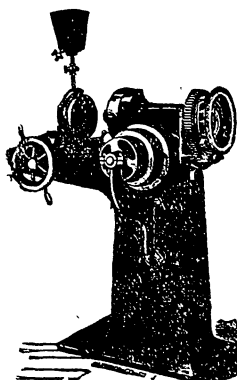
COFFIN & LEIGHTON, Syracuse, N. Y.

DRILL PRESSES
THE LARGEST
VARIETY
SEND FOR NEW
80 PAGE CATALOGUE
JUST OUT
DWIGHT SLATE
MACHINE CO.
HARTFORD, CONN.

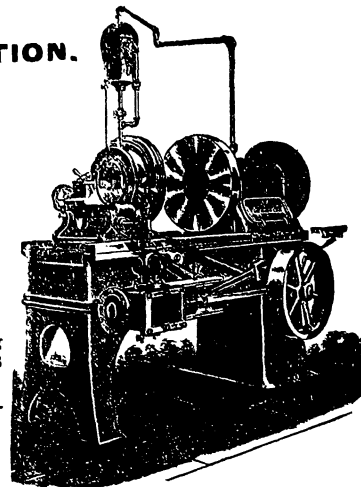
**ARMSTRONG MAN'G CO.**

BRIDGEPORT, CONN.

OUR ADJUSTABLE STOCKS and DIES are universally acknowledged to be the BEST! We also make all our Tools on the same principle of the Best Material and Workmanship, and always a view of time and labor saving in their use.

JARECKI MFG. CO. (Limited), Erie, Pa.
**PIPE THREADING AND
 CUTTING TOOLS OF
 ALL DESCRIPTION.**

 Write for Catalogue showing
 the most complete line of 1-8
 inch to 16 inch for hand, belt,
 engine and with electric mo-
 tor attachment.

We can furnish Bolt Threading Attachment for this Machine.

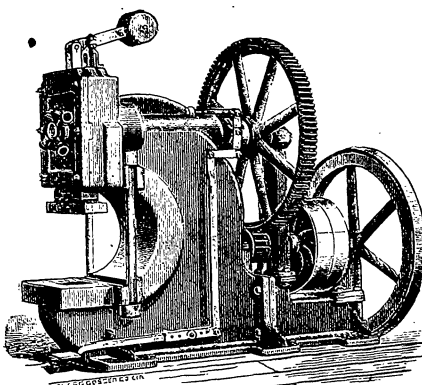


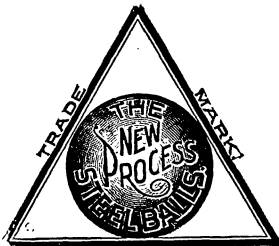
W.W. MINER

G.W. PECK

S. PECK

MINER & PECK M'FG CO.,
 SUCCESSORS TO
BEECHER & PECK,
 SOLE MANUFACTURERS OF
THE PECK PATENT DROP PRESS
DROP FORGINGS, BLAST FORGES.
NEW HAVEN, CONN.

**No. 0 Punch**
 One of our heaviest punches. Adapted particularly for Bridge and Arch Iron Workers. Has a high throat; will punch 1½ in. through 1¼ in. iron. Made from 15 in. to 40 in. throat. **WE MAKE ALL KINDS OF PUNCHES and Shears.** Write for Cat.

The Wais & Roos Punch and Shear Co.,
 CINCINNATI, O.
STEEL BALLS

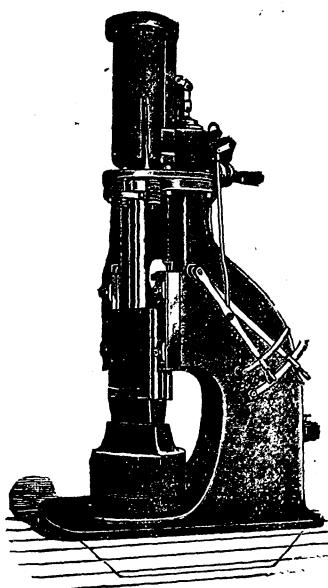
For all purposes, from Bicycles to the heaviest class of machinery. Write to us for prices and samples, also for information when in doubt about the proper application of balls to heavy bearings.

GRANT ANTI-FRICTION BALL CO.,

Fitchburg, Mass.


Bullock Bellows Co.,
 Cleveland, Ohio.

 Largest
 Mfrs.
 in the
 World



Bement, Miles & Co.,

PHILADELPHIA, PA.,

Builders of

Metal-Working Machine Tools

For railroad shops, locomotive and car builders,
machine shops, steam forges, shipyards, boiler
shops bridge works

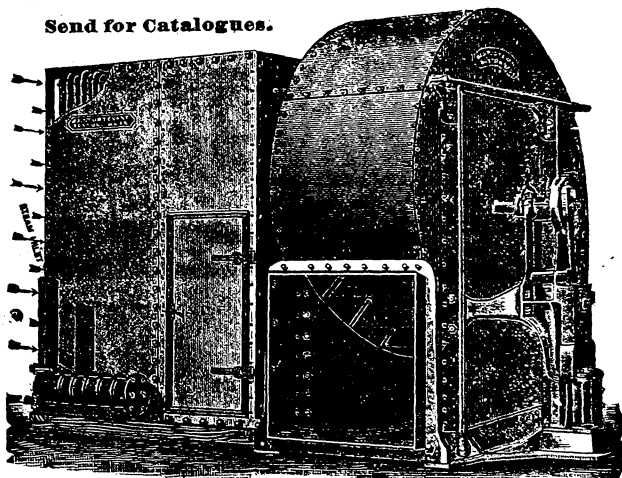
**Steam Hammers for Working Iron
or Steel.**

NEW YORK OFFICE, Equitable Building,

GEORGE PLACE, Agent.

THE STURTEVANT SYSTEM OF HEATING AND VENTILATING

Send for Catalogues.



Manufacturing
Establishments.

**PRESSURE
BLOWERS.
PORTABLE
FORGES.**

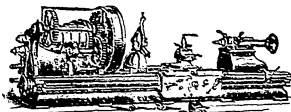
B. F. Sturtevant Co.
Boston, Mass.
91 Liberty Street,
NEW YORK.
16 South Canal St.
CHICAGO.
35 North Third St.
PHILADELPHIA.

FITCHBURG MACHINE WORKS,

MANUFACTURERS OF THE CELEBRATED

FITCHBURG

AND OTHER



48-inch Engine Lathe.

ENGINE LATHE

METAL-WORKING MACHINES.

**FITCHBURG
MASS.**

SEND FOR
CATALOGUE B.

THE COULTER & MCKENZIE MACHINE CO.

BRIDGEPORT, CONN.,

MAKE A FIRST-CLASS

BOILER TEST PUMP.

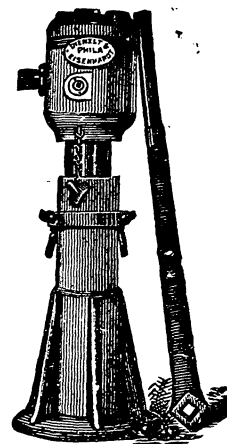
PRICE, \$15.00.

SENT ON APPROVAL.

PATENT RAW HIDE BOUND MALLETS & CHISEL HANDLES
POSITIVELY WILL NOT SPLIT
PATENT RAW HIDE PINIONS
ESPECIALLY ADAPTED TO HIGH SPEED MACHINERY. NOISELESS
MORE DURABLE THAN METAL. NO LUBRICANT REQUIRED.
NEW PROCESS RAW HIDE CO.
PATENTEES & SOLE MANUFACTURERS SYRACUSE N.Y., U.S.A.

RELIANCE HYDRAULIC JACKS.

SUPERIOR TO ANY JACK NOW MADE.
Absolute in its actions in any position.
Under complete and instantaneous control.



MADE IN FOUR SIZES,
to 15, 20 and 30-ton capacity, to lift 12 or 18
inches. Broad Base or Ground Lift.

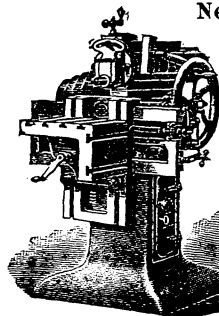
DIENELT & EISENHARDT
Makers,

1808 Howard Street, Philadelphia,

NEW HAVEN MANUFACTURING CO.,

New Haven, Conn.

Manufacturers of



**Lathes,
Planers,
Drills,
Slotters,
ETC.**

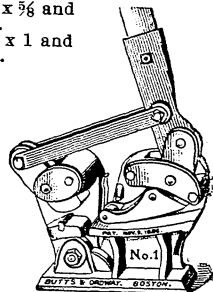
B. & O. TIRE UPSETTER. SURE GRIP.

No. 1, Upsets 3 x 5/8 and
smaller.
No. 2, Upsets 4 x 1 and
smaller.

IT IS WITHOUT A
FAULT. ONE MOTION
DOES IT ALL.

Every machine is
tested and warranted
to give satisfaction.
We confidently offer
this Upsetter as the
best to be had.

Send for Price.
BUTTS & ORDWAY,
500 Atlantic Ave.,
BOSTON, MASS.

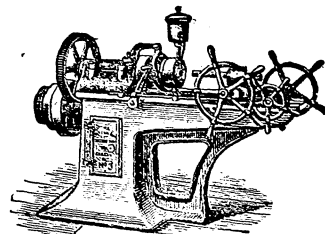


THE NATIONAL MACHINERY CO.

TIFFIN, OHIO

— MANUFACTURERS OF —

BOLT AND NUT



MACHINERY

OF EVERY DESCRIPTION.

Upsetters and Benders,

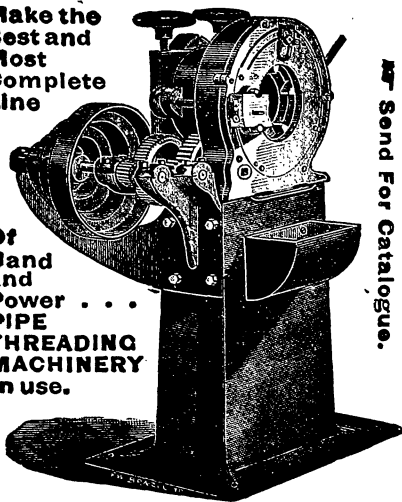
Car Link and Pin Machinery.

CATALOGUE SENT ON APPLICATION.

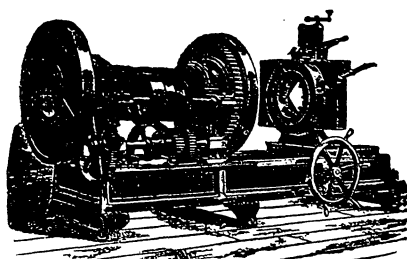
The Merrill Manufacturing Co.,
Toledo, Ohio,

Make the
Best and
Most
Complete
Line

Of
Hand
and
Power . . .
PIPE
THREADING
MACHINERY
in use.

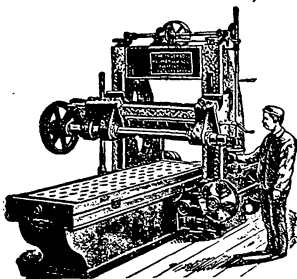


Send For Catalogue.



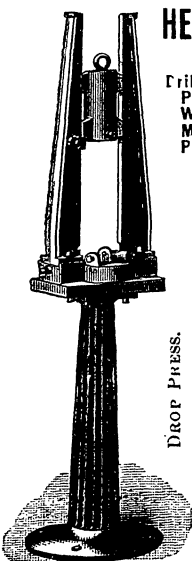
BIGNALL & KEELER MFG. CO., St. Louis, MO.
MANUFACTURERS OF
Peerless Duplex Pipe Cutting and Threading
Machines. Send for Catalogue.
Our Prices are Low and our Goods are the Best.

The Ingersoll Milling Machine Co.,
ROCKFORD, ILL.



36 inch x 36 inch x 8 feet Milling
Machine. Weight, 22,000 lbs.

WE MAKE A
SPECIALTY
OF
Heavy
Slab
Milling
Machines
Sizes, 15 inches
square to 36
inches square
to mill any
length.

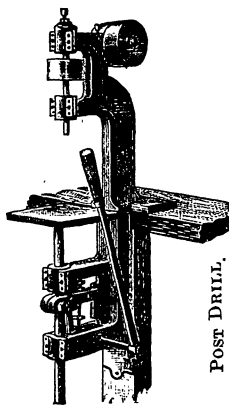


Send for Catalogue.

HERRICK & COWELL

Manufacturers,

Drill Presses, Paper Box, Buffing,
Polishing, Electrotypes, Emery
Wheel Machinery, and Special
Machinery. Power and Foot
Presses.



NEW HAVEN, CONN.

D. SAUNDERS' SONS

MANUFACTURERS OF PATENT



In three styles. **One Wheel and Roller Cutter, Three Wheeled Cutter** and the **Tool Cutter**, for cutting **Brass, Copper** and **Wrought Iron Tubes**. Also mfrs. of **Pipe Cutting** and **Threading Machines** $\frac{1}{4}$ in. to 16 in., Hand or Power.

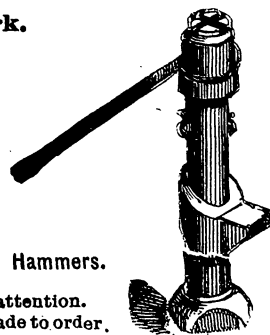
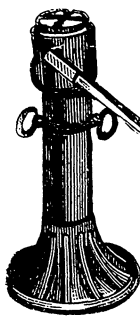
Send for Catalogue to **27 ATHERTON ST., YONKERS, N. Y.**

RICHARD DUDGEON,

No. 24 Columbia Street, New York.

Maker and Patentee of the Improved

Hydraulic Jacks
AND
Punches.



Roller Tube Expanders and Direct-Acting Steam Hammers.

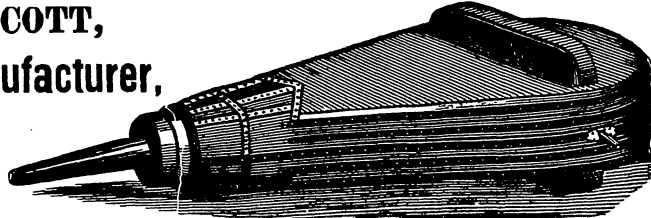
Communications by letter will receive prompt attention.
Jacks for pressing on Car Wheels or Crank Pins made to order.

GEO. M. SCOTT,
Bellows Manufacturer,

Johnson Street

Cor. 22d St.,

CHICAGO ILL.



ILLINOIS IRON & BOLT CO.,

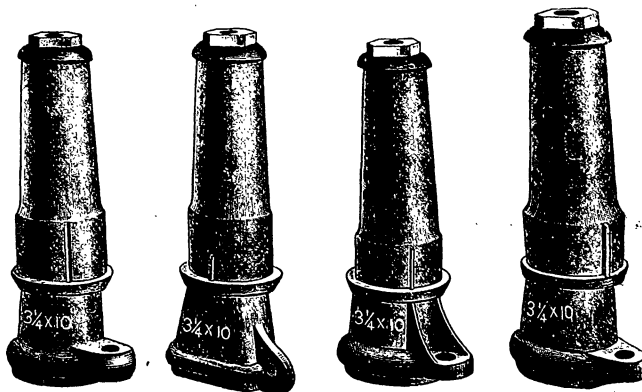
Nos. 20 to 26 Main Street,

CARPENTERSVILLE, KANE CO., ILL

MANUFACTURERS OF THE

Special Cast Iron Wagon Skeins.

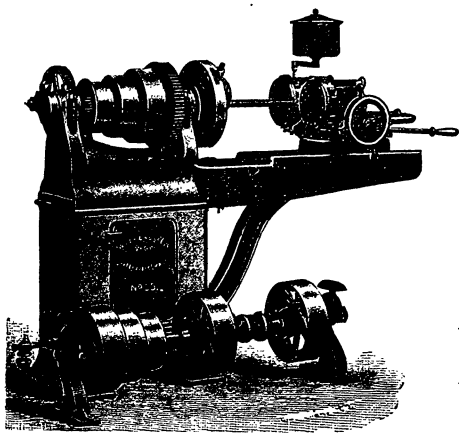
Extra Heavy and with Boxes made to Wedge in.



BLACKSMITHS' TOOLS,

JACK SCREWS, TIRE BENDERS, TRACK JACKS, &c.

Green River Bolt-Cutting, Nut-Tapping and Pipe-Threading Machines with OPENING DIES.



This machine has the very great advantage of opening-dies, which do not need to be adjusted, but stand always ready for work and instantly release the bolt when threaded, without being run back over the screw, thereby saving nearly enough time to thread another bolt, and also saving much wear on the dies. By simply turning the hand wheel the dies separate and the work can be taken out. There are so many sizes of dies in a pr. of holders that it requires but an instant to change from one size to another. This makes it possible to thread a lot of bolts of different sizes almost as quick as if all were of the same size. Each die cuts a full thread at one operation, and the hollow spindle allows a screw of any desired length to be cut. We know of no machine which can approach it for quickness and convenience in threading bolts or pipe. We cannot recommend it too highly to any one in need of a perfect bolt-cutter and pipe-threader.

SEND FOR CATALOGUE.

Wiley & Russell Mfg. Co.
GREENFIELD, MASS., U. S. A.

Ferracute Machine Co.

BRIDGETON, N. J., U. S. A.,

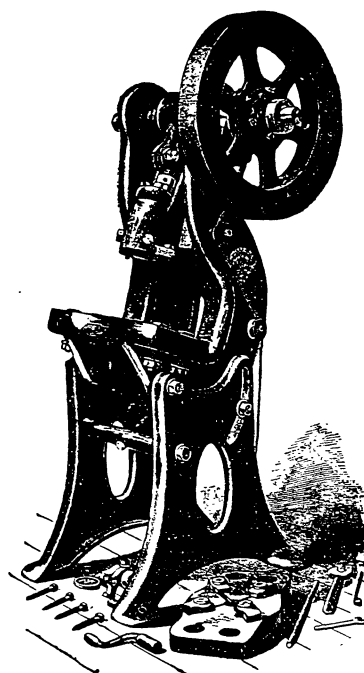
MANUFACTURERS OF

FOOT AND POWER

PRESSES, DIES,

AND ALL OTHER

Tools for Bar and Sheet Metals.



Send for Illustrated Catalogue containing sizes, weights and prices of one hundred kinds of Presses and other Tools for Brass Goods, Locks, Hardware, Nuts, Washers, Drop Forgings, Railroad, Bridge and other General Machine Shop Work, &c. Also for Tinware, Cans, Boxes, Lamps, Gas Fixtures and Silverware, &c., &c.



FOR
Substantial, Well Made,
Low Priced, Patented

20 Inch Drills,

with latest improvements,
Lever, Combination or Wheel
Feed, address

Sibley & Ware,
South Bend, Indiana



CHUCKS

ALL STYLES.

NEW REVERSIBLE JAWS

(DOVETAILED).

'92 Catalogue now ready.

THE HOGGSON & PETTIS MFG. CO.

Est. 1849. NEW HAVEN, CONN.

Maule's "Skeleton" Pipe Die

Two "Points" about it—only 2 (There are plenty more, but we only mention these two here.)

I

The First Cost to you of MAULE'S "SKELETON" PIPE DIE is less than that of any other Pipe-Threading Die—and

2

Before it becomes dull from use it will cut as many perfect threads as the best solid die extant, and when it is dull, you don't throw it away and buy a new one—Oh, no! You simply sharpen the cutters on a common grindstone, and so make it practically as good as it was at first, and this sharpening process may be repeated a number of times.

A sample One-inch "Skeleton" Pipe Die, either $2\frac{3}{8}$ or $2\frac{1}{2} \times \frac{3}{4}$ thick, by mail, postage prepaid, will cost you 62 cents, and will be sent upon receipt of a Postal note for that amount.

DO NOT SEND US ANY POSTAGE STAMPS.

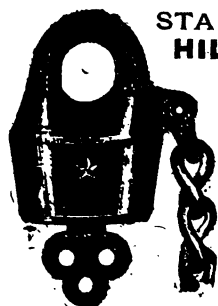
You may return such sample to us, at our expense, if, after seeing it, you do not consider it worth the price. Don't the above sound as if it might save you some money—if TRUE?

HENRY B. PANCOAST & CO.,

243-245 South 3d Street. Philadelphia, U. S. A.

ASK YOUR JOBBER WHAT HE KNOWS ABOUT THIS TOOL.

Wire Drawing Machines, **WATERBURY**
Gang Slitters, **MACHINE CO.,**
Power Presses and Dies, Waterbury, Conn.
Tumbling Barrels, **MANUFACTURERS.**
Special Machinery. Send For Prices.



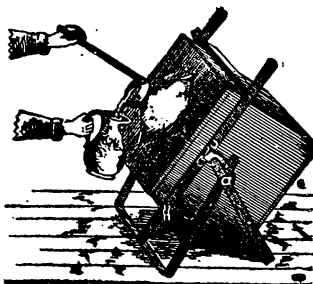
STAR LOCK WORKS, PHILA
HILLEBRAND & WOLF,
Manuf'rs of

1st QUALITY ONLY
SCANDINAVIAN
AND
SPRING PADLOCKS
Trunk & Case

Locks, Carboy

Stands, &c.

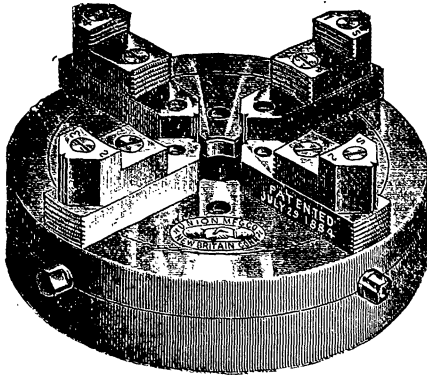
CATALOGUES SENT ON APPLICATION.



UNION MANUFACTURING COMPANY, NEW BRITAIN, CONN.

WAREHOUSE. 103 CHAMBERS ST., NEW YORK

Manufacturers of Combination Chucks, Universal Chucks, Independent Chucks, Combination Reversible Jaw Chucks, Car Wheel Chucks, &c., &c.



Union Chuck No. 21.

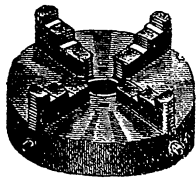
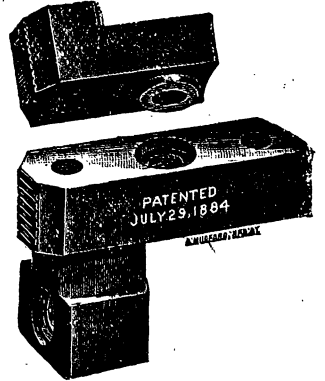
Combination with Reversible Jaws.

ALSO

Showing Sectional Cut of Jaw.

We guarantee our Chucks in every particular.

WRITE FOR CATALOGUE AND PRICE-LIST,



SKINNER CHUCKS.

Independent, Universal and Combination Lathe Chucks

Also DRILL CHUCKS
Skinner Chuck Co.,
NEW BRITAIN CONN.

Send for CATALOGUE.

Chucks

The NATIONAL.
INDEPENDENT.
UNIVERSAL.
COMBINATION.

Strongest. Easiest to change. Best Finish.
Reversible Jaws (patented) giving 5 changes
including every possible desired position.
New CATALOGUE, illustrated, sent free. Lib-
eral discounts. Prompt shipment. Address
WM. WHITLOCK, 132d St. & Park Ave., N. Y.

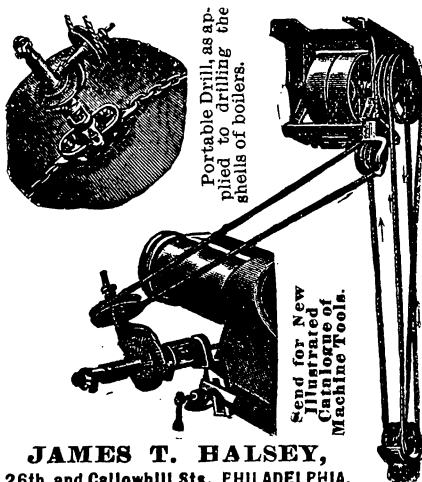
FRICION CLUTCHES, SHAFTING, HANGERS, PULLEYS.

Sheaves for Rope Driving.
Gear Wheels.

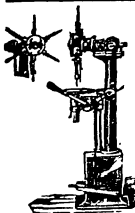
FRICION PULLEYS.

KEYSTONE CLUTCH AND MACHINE WORKS,

1708-1710 Germantown Ave.,
PHILADELPHIA, PA.



JAMES T. HALSEY,
26th and Callowhill Sts., PHILADELPHIA.



QUINT'S TURRET DRILLS

Six Spindle.

Drills from 1-32 to 1/4 hole. Speed
from 250 to 2000 rev.

Suitable for a large variety of
work and is operated with ease
and rapidity.

SEND FOR CIRCULAR.

A. D. QUINT, Hartford, Conn

'CUSHMAN' CHUCKS.

We manufacture and keep in stock a full line of chucks for all purposes

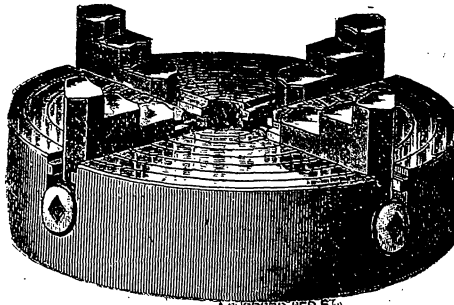
Independent 4 Jaw Chucks from 4 to 26 Inch.
Patent 4 Jaw Lathe Chucks from 4 to 26 Inch.
Reversible Face-Plate Jaws for Use on Lathes from 30 to 72 Inch.
Two-Jaw Chucks, Round and Box Body, from 4 1/2 to 18 Inch.
Universal Chucks from 2 to 21 Inch, in several styles.
Combination Chucks from 4 to 24 Inch.
Drill Chucks four styles.
Centering Chucks.
Special Chucks for Cutting-off Machines. A full line and some new Improvements.

We also make a great variety of special Chucks for holding bicycle parts, valves, fittings and other special shaped pieces.

A 44-Page Catalogue Sent on Application.

THE CUSHMAN CHUCK CO., Hartford, Conn.

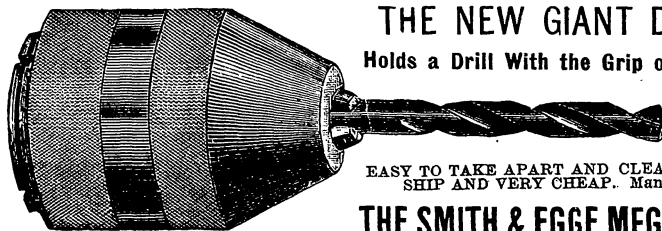
CHAMPION INDEPENDENT CHUCKS.



An entirely new line of small
Chucks, provided with 3 or 4 inde-
pendent reversible steel jaws. The
best Chuck in the market for foot
lathes. Ask your dealer for them
or write to us.

THE D. E. WHITON MACHINE CO.
New London, Conn.

Sole European Agents SELIG SONNENTHAL & CO., London.



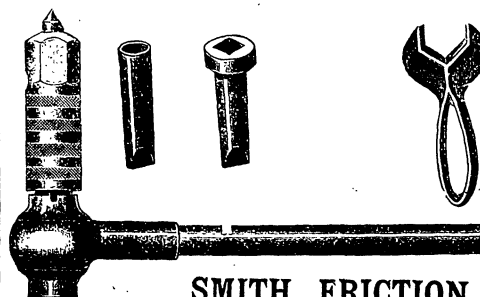
THE NEW GIANT DRILL CHUCK.

Holds a Drill With the Grip of a Giant. All Steel.
Parts Interchangeable.
SIMPLE IN CON-
STRUCTION.

EASY TO TAKE APART AND CLEAN. BEST OF WORKMAN-
SHIP AND VERY CHEAP. Manufactured and sold by

THE SMITH & EGGE MFG. CO., Bridgeport, Conn

Instantaneous Clutch.



No Lost Motion.

COMBINATION

Friction Drill-Stock,

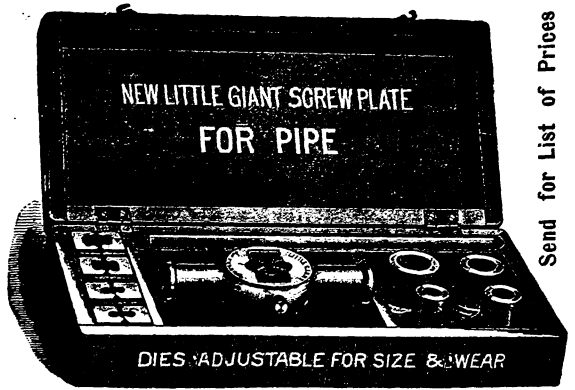
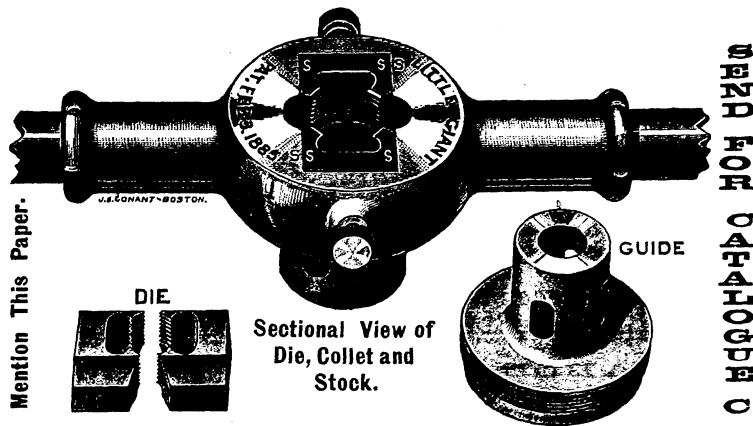
— FOR —

TWIST AND FLAT DRILLS.

SEND FOR CATALOGUE.

SMITH FRICTION DRILL AND TOOL CO.,
BOSTON, MASS.

NEW LITTLE GIANT ADJUSTABLE DIE SCREW PLATE FOR PIPE.



Send for List of Prices

To change from one size to another, simply screw out the guide, drop out the die, and replace with size die and guide required.

PRACTICAL, SIMPLE AND DURABLE.

MANUFACTURED BY
WELLS BROS. & CO.,
Greenfield, Mass., U. S. A.

DON'T

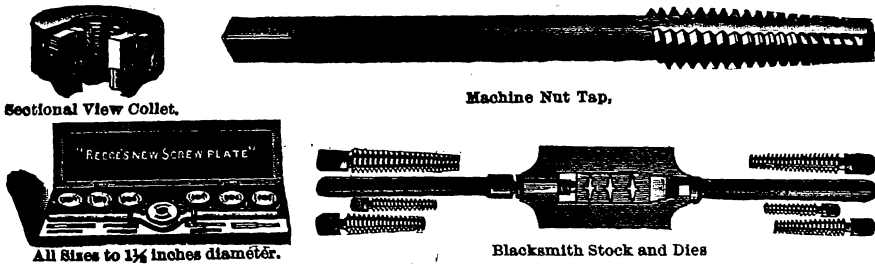
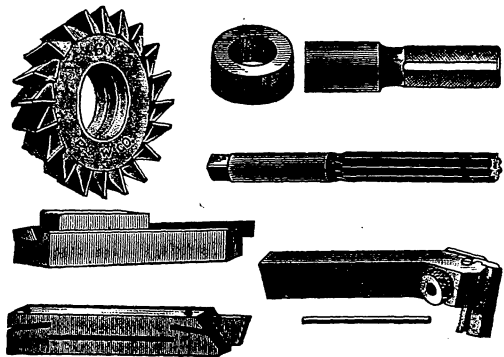
Waste Steel and time in forging ordinary diamond point and side turning tools, V and square thread cutting and cutting-off tools, but use holders with inserted cutters that are made on the interchangeable plan for these purposes.

DON'T make milling cutters, taps, dies, reamers, boiler plate punches, or do without gauges, but save money by using those made by

THE PRATT & WHITNEY CO.,

Hartford, Conn., U. S. A.

For Illustration and Prices ask for the **HARDWARE CATALOGUE.**

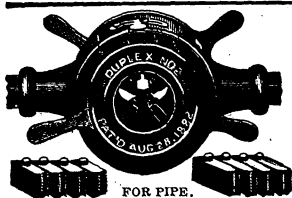


BUTTERFIELD & CO., Derby Line, Vt.,
Manufacturers of **SCREW-CUTTING TOOLS** in Great Variety.
WRITE FOR ILLUSTRATED CATALOGUE.

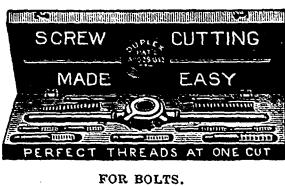


Three styles of Screw Plates **BUILT ENTIRELY ON HONOR**, with prices to suit all.
Write for catalogue.

CHAMPION BLOWER & FORGE CO., - - LANCASTER, PA.



THE ADJUSTABLE
"DUPLEX" DIE STOCK.
Quick. Accurate. Durable.
15,000 now in use.
HART MANUFACTURING CO.,
CLEVELAND, O., U. S. A.



REECE'S PATENT HAND BOLT CUTTER OR SCREW PLATE.



DRILL GRINDER.



THE STANDARD TOOL CO., CLEVELAND, OHIO.

MANUFACTURERS OF

Increase: Twist Drills, Reamers, Taps, Milling Cutters and Chucks.

Taper Shank
Drills,
St. Shank Drills,
Screw-driver
Bits,
Reamers,
Shell and Solid
Taper Reamers.



Bit Stock Drills for Metal or Wood.



Wood-Boring Brace Drills, will cut off nails.

Hand Taps,
Mach. Screw Taps
"Standard" Drill
Chuck,
"Ellenwood" Drill
Chuck,
Sq. Shank Drill
for Ratchets,
Twist Drills for
Blacksmiths'
Presses

Sockets for
Taper Shank
Drills.

Reamers in
all sizes.

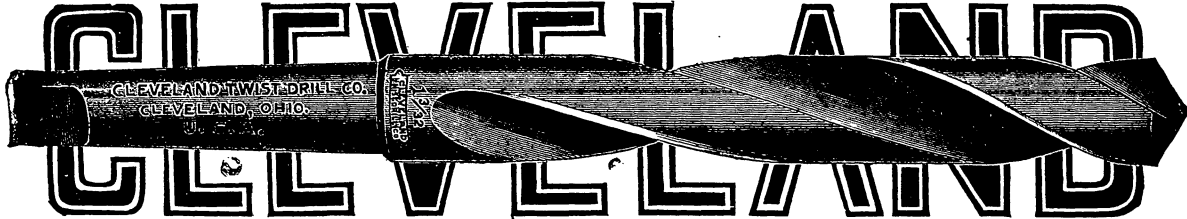
NEW YORK OFFICE, 33 CHAMBERS ST. Send for Catalogue

1874

OLD RELIABLE.

1898

Send For Catalogue.



Write For Discounts.

Our Drills are Hot Forged. The best part of the steel IS NOT CUT OUT and thrown away.



They are TOUGHER, STRONGER, BETTER than is possible to attain by milling. Catalogue and Discounts sent on application.

STOW FLEXIBLE SHAFT,

Invented and
Manufactured by

THE

STOW MFG. CO.,

Established 1875, Binghamton,
N. Y.

PORTABLE.

DRILLING
TAPPING.

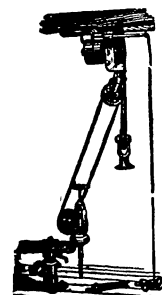
REAMING.

General European Agents,

SELIG SONNENTHAL & CO.,

85 Queen Victoria St.,

LONDON, ENGLAND.



Thos. H. Dallett & Co.

York St. and Sedgley Ave.,
PHILA.

MANUFACTURERS OF
Portable Drills, Hand
Drills, Boiler Shell Drills
Electric Motors specially
adapted for driving Ma-
chine Tools, Cranes, Ele-
vators, Pumps, Presses and
other machinery.

Complete Power and Light
Plants Installed.

Stow Flexible Shaft Co., Limited,

26th, Callowhill & Biddle Sts.

PHILA., PA.,

Manufacturers of

PORTABLE DRILLING,
TAPPING, REAMING
and BORING MACHINE

Also Tools for Emery Wheel
Grinding, Metal and Wood Pol-
ishing, Cattle Brushing and
Clipping, &c.

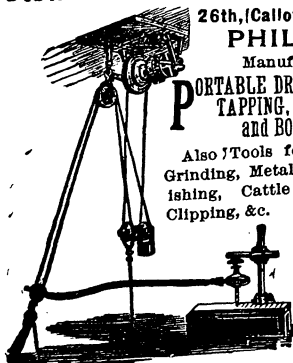
Gen'l European
Agents.

Bolling & Lowe,

2 Lawrence,

Pountney Hill.

LONDON, ENG.



Morse Twist Drill & Machine Co., NEW BEDFORD, MASS.

Manufacturers of Morse Pat. Straight-Lip Increase Twist Drills,



Bit Stock Drills, Solid and Shell Reamers, Drill Grinding Machines,

Milling



Cutters,

Beach's Patent Self-Centering Chucks, and Special Tools to Order.



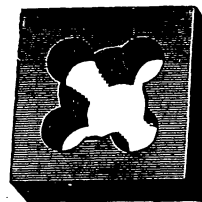
ALL TOOLS EXACT TO WHITWORTH STANDARD GAUGES.

MANNING, MAXWELL & MOORE,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



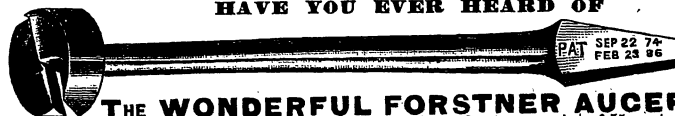
Manufacture of Patent Machine Relieved Nut, Hand,
Blacksmith and Machine Screw Taps, Screw Plates, Tap
Wrenches and Patent Relieved Pipe Taps and
Pipe Reamers; also of Solid Bolt and Pipe
Die. Furnished in V. U. S. Standard and
Whitworth shape of threads.



111 Liberty Street,

NEW YORK.

HAVE YOU EVER HEARD OF



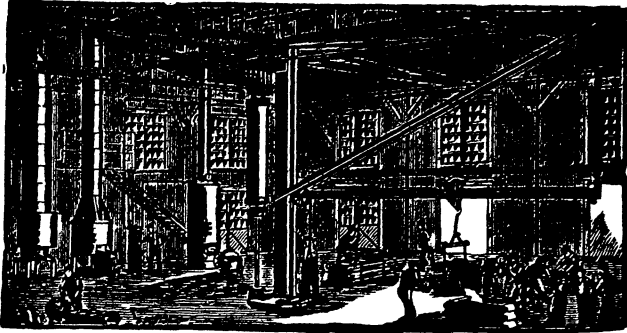
THE WONDERFUL FORSTNER AUZER BIT ?

If not, it will pay you to send for a sample 4-8 bit and price-list. Sent on receipt of 55 cents. It will bore
Round, Oval and Square Holes, and cannot be equaled for fine carpentry, cabinet or pattern work. Discount
to dealers on application.

Depot for Sales.

THE BRIDGEPORT GUN IMPLEMENT CO.,

313 and 315 Broadway, New York

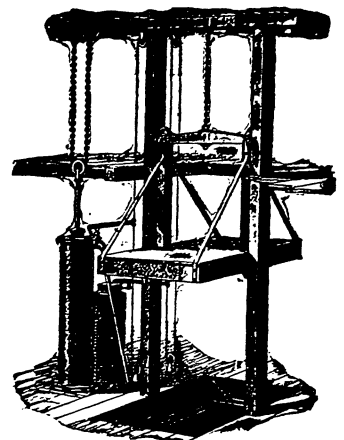


5-ton Ridgway Crane in Foundry Diamond State Iron Co., Wilmington Del.

**SAFE,
RAPID,
SURE**

—AND—

NOT COSTLY.



Steam-Hydraulic Elevator.

RIDGWAY STEAM HYDRAULIC CRANE.

Protect the Lives of Your Men!

TERRIBLE ACCIDENT IN A FOUNDRY.

CRANE CHAIN BREAKS WITH LADLE OF MOLTEN IRON.

TO THE EDITOR OF THE IRON TRADE REVIEW:

Enclosed find clipping from the Sharon, Pa., *Telegraph*, of June 24, giving an account of an accident at our works which fearfully demonstrates "The Unexpected in the Foundry." A sixty-ton heat was in progress of being run off and at the second lifting of the crane ladle, the hoisting chain parted and let the ladle drop five feet, striking the side of the cupola's ladle pit, and throwing the metal over the body of George Milser. Though almost enveloped by seething fluid iron, he retained his senses, and while attempting to crawl out of the metal was grasped by two men, who were horrified to find his skin come off at every touch. The unfortunate man lived three hours. It is the first serious accident I have had under my management of heavy work, for 24 years in the foundry. It took two and a half hours to resume melting, and after running down what iron remained in the cupola, the bottom was dropped. The chain which broke was best English make, and tested to lift 20 tons with safety. Its load at the time of the accident was about five tons. This suggests the query, *Why do chains generally break with the lighter loads?* This, I think, is the experience of others as well as myself. Yours truly, THOS. D. WEST.

Sharpsville, Pa., June 26, 1893.

The Ridgway Steam-Hydraulic Crane saves such accidents. In our crane the load is held by four separate and independent short chains, two at each end of the jib. Each of these chains is amply heavy to alone safely support the load. The breaking of a single link will not allow the load to drop. Two chains must break at the same end at the same moment to drop the load. An impossibility. Our crane cannot be overloaded, as diameter of cylinder fixes the maximum load. If there is such a thing as Perfection in a machine, it is found in our Steam-Hydraulic Crane. Of the large number in use in the best Foundries all over the land, the universal verdict is that it is

THE GREATEST FOUNDRY CRANE KNOWN.

The crane that fills the exacting requirements of a foundry is the crane for Everywhere.

CRAIG RIDGWAY & SON,

Coatesville, Pa.

THE WOODRUFF SYSTEM OF KEYING

Does not require skilled labor to cut key way or fit key.

The peculiar way of inserting the key practically makes it part of the shaft.

A man will fit more than double the number of keys in a day than by the ordinary method.

Will save you from 50 to 75 % on the cost of your keying.

ENDORSED BY MECHANICS AND ENGINEERS.

Illustrated pamphlet containing a full description will be sent free on application.

FOR MACHINERY THE WOODRUFF MFG. CO., Hartford, Conn.

NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUB

IF I REST I RUST.

A German philosopher said this, and it is just as applicable to iron of all kinds unless it is protected by a coat of

BONNELL'S NUBIAN IRON ENAMEL,

THE BEST BLACK ON EARTH

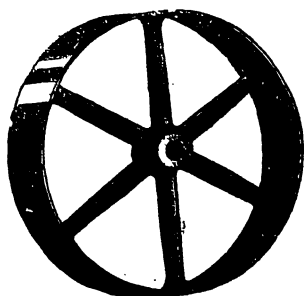
For all purposes where you now use asphaltum or similar blacks. Made in all qualities from cheapest to best. Every gallon guaranteed.

77 Warren St., New York, N. Y.

THE NUBIAN IRON ENAMEL CO.,

33-35 Nubian Ave.,
CRAGIN, ILL.

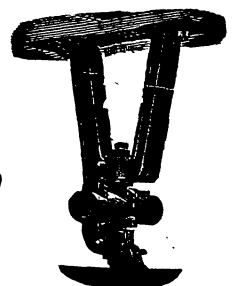
NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUB



**Pulleys, = =
= = Hangers,**

Journal Boxes, Wall Brackets, and other shop repairs.
A full line and low in price. Manufacturers will do well to correspond with us.

J. W. FOLEY & CO., 329-337 W. Front Street, Cincinnati, O.





SELL THE BEST.

**THE "SURE GRIP"
Steel Tackle Block**

is taking the place of all other hoisting blocks.

Send for catalogue and discount

Fulton Iron & Engine Works,
28 Brush St., Detroit, Mich.

ESTABLISHED 1852.



Highest Efficiency.

**WESTON'S NEW
TRIPLEX**

Chain Block

far exceeds all predecessors. Send for Prof. Thurston's report of comparative tests of all chain pulley blocks.

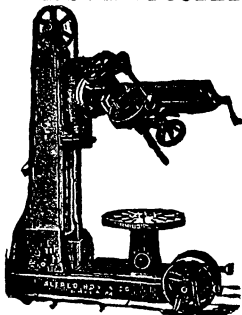
The Yale & Towne Mfg. Co.
STAMFORD, CONN.

New York, 84-86 Chambers St.
Chicago, 152-154 Wabash Ave.
Philadelphia, 1120 Market St.
Boston, 224 Franklin St.

Alfred Box & Co.,
Front, Poplar and Canal Sts., Philadelphia.

SOLE MANUFACTURERS OF

BOX'S PAT. DOUBLE SCREW HOISTS.



25,000 supplied in the United States exclusive of foreign trade; a record that tells its own story; a record of solid, substantial growth; extensive new works necessary to keep up with orders in our specialties; ample room now to build the heaviest class of Traveling and Jib Cranes of all sizes, Overhead Railways, Trolleys, Special Hoisting Gear for home-made Cranes; also our Patent Radial Drills and Gang Drills, as used by bridge builders. Estimates furnished with photos. Correspondence solicited, or visit our works.

Moore Mfg. & Fdry. Co.,

Milwaukee, Wis., U. S. A.,

Manufacturers of

Moore's Anti-Friction

Differential

Chain

Pulley

Block.

A New Movement!
A Perpetual Compound Lever!
Powerful, Simple and Durable!
One Man Can Lift to the Full Capacity of the Block.
Self-Sustaining at Any Point.
The Block Always Hangs Plumb.

Send for descriptive price-list, mentioning this paper.

Salem Foundry and Machine Shop

BUILDERS OF

ELEVATORS

SALEM, MASS.

A WORD TO THE WISE.

Our ELECTRIC MOTORS

are operating numerous

**IRON AND STEEL MILLS AND MACHINE SHOPS ECONOMICALLY,
SUCCESSFULLY AND SATISFACTORILY.**

WRITE FOR OUR ILLUSTRATED CATALOGUE.

THOMSON-HOUSTON MOTOR COMPANY

BRANCH OFFICES:

44 Broad St., New York.

620 Atlantic Ave., Boston, Mass.

173 & 176 Adams St., Chicago, Ill.

509 Arch St., Philadelphia, Pa.

Fifth and Race Sts., Cincinnati, O.

401-407 Sibley St., St. Paul, Minn.

Masonic Temple, Denver, Col.

Equitable Building, Atlanta, Ga.

1338 F St., N. W., Wash., D. C.

15 First St., San Francisco, Cal.

All business outside the United States transacted by THE THOMSON-HOUSTON INTERNATIONAL ELECTRIC CO., 44 Broad Street, New York.

LATHES.

ISRAEL H. JOHNSON, JR., & CO., - PHILADELPHIA.



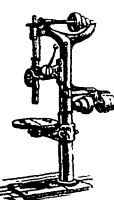
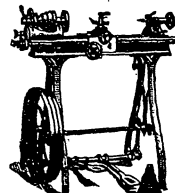
Patent Foot Power Machinery

SCROLL SAWS, CIRCULAR SAWS,
MORTISERS, LATHES, &c

For Carpenters, Builders, Cabinet Makers, and all Wood and Metal Workers. Catalogue free.

SENECA FALLS MFG. CO.,

255 Water St., Seneca Falls, N. Y.



FULL UNIVERSAL,

RADIAL and UPRIGHT.

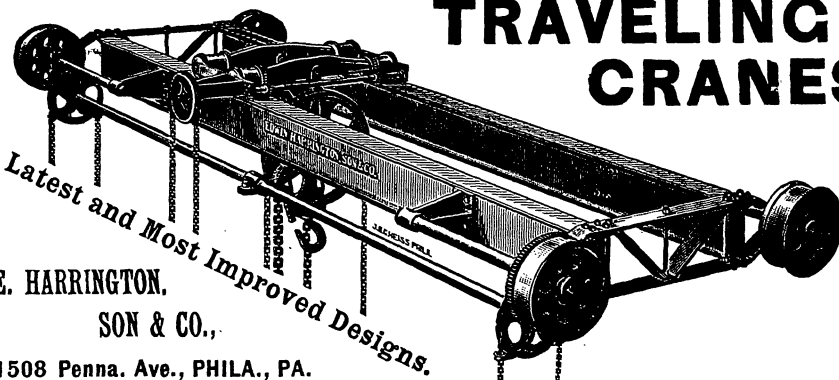
BORING and TURNING MILLS.

BICKFORD DRILL AND TOOL CO.,

10 Lawrence St., Cincinnati, O.



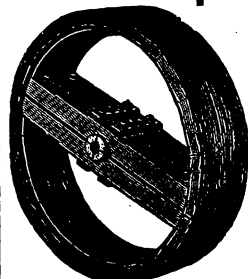
**TRAVELING
CRANES**



Latest and Most Improved Designs.
**E. HARRINGTON,
SON & CO.,**
1508 Penna. Ave., PHILA., PA.

Wood Split Pulley.

Strongest,
Lightest,
Simplest,
Cheapest



Wood split pulley in the world. Satisfaction guaranteed. Write for price-list and descriptive Catalogue. Address

REEVES PULLEY CO.,

1220 E. 7th Street, COLUMBUS, IND.
New York Agents,
Patterson, Gottfried & Hunter, 146-150 Centre St.

DUNHAM NUT MACHINE CO.,

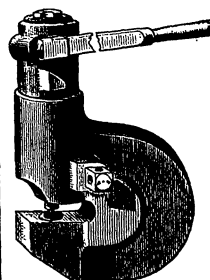
Unionville, Conn.,

Manufacturers of

AUTOMATIC COLD PRESS NUT MACHINES

FOR MAKING CHAMFERED AND TRIMMED NUTS.

Correspondence Solicited.



A. L. HENDERER,
Wilmington, Del.,

Manufacturer of

Hydraulic

Punches,

Screw Punches,

Forged Steel Expanders, Flue Hole Cutters, Boiler Test Pumps and Pipe Vises.

Price-lists and discounts on application.

THE ROBERT W. HUNT & CO.

Bureau of Inspection, Tests and Consultation.

Rails, Splices and Cars. Analytical and Physical Laboratories. Examination of Iron and Steel Works and advice on Processes.

General Office: The Rookery, Chicago. Branch Offices: Hamilton Building, Pittsburgh; 28 Chestnut St., Philadelphia; 80 Broadway New York.



William Sellers & Co., Incorp.

PHILADELPHIA, PA.,

—MANUFACTURERS OF—

Improved Machine Tools for Working Iron and Steel,
High Speed Power Traveling and Swing Cranes,
Injectors, Locomotive Turn Tables, Shafting, &c., &c.
Testing Machines, under patents of A. H. Emery.

Prices, Descriptive Matter, &c., Furnished on Application.

MORSE ELEVATOR WORKS.

MORSE, WILLIAMS & CO.,

Manufacturers and Builders of

Electric, Hydraulic, Belt and Hand Power Passenger and Freight

ELEVATORS.

1105 Frankford Ave., Philadelphia,

108 Liberty St., New York.

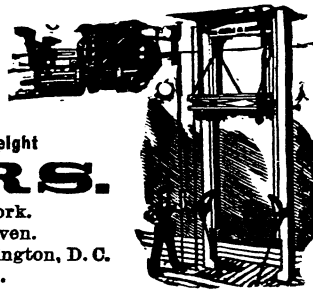
83 Lincoln St., Boston,

82 Church St., New Haven.

425 Spruce St., Scranton, Pa.,

116 E St., N. W., Washington, D. C.

1118 Chamber of Commerce Building, Chicago, Ill.



WORLD'S COLUMBIAN EXPOSITION.

VISITORS are requested to examine the merits of the

OPEN SIDE PLANERS.

These Planers may be seen in operation at the exhibit of the
DETRICK & HARVEY MACHINE CO. of Baltimore, Md.

Location in Machinery Hall, Section 13, Column J 41.

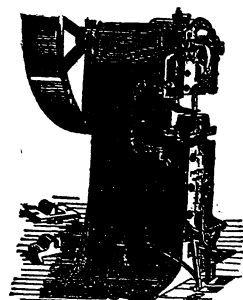
FAIRMOUNT MACHINE CO.,

(Successors to Thomas Wood & Co.)

Twenty-second and Wood Sts., Philadelphia, Pa.

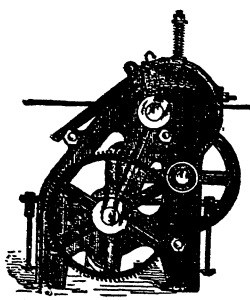
Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Elevators.

Rope Transmission; Sheave Wheels, any size required, for Hemp, Manila and Cotton Rope Driving. Looms, Cotton and Woolen Machinery for Winding, Spooling, Reeling, Beaming, Warping, Dyeing, Sizing, Scouring &c.



Machine for Punching, Shearing, Stamping, Forging, &c. The lower die-holder is movable when used for forging stamping, bending, &c. This machine can be put up in any part of the building.

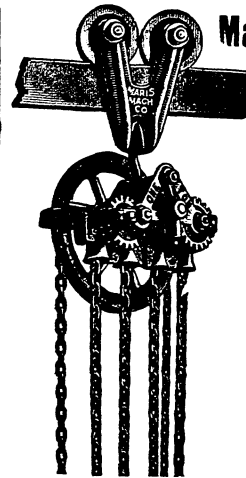
Bending Machine for Bar and Sheet Metal, for House, Boat and other work which has to be done quickly, correctly and in large quantities.



H. A. SCHNEEKLOTH,

Patentee and Manufacturer,

530 W. 28th St., New York.



Maris & Beekley,
PHILA., PA.

MANUFACTURERS OF
CRANES,

Power Bridge
Cranes, Hand
Bridge Cranes,
Jib Cranes.

Portable Hoist.
Holds load at any
point.

Overhead Track,
Trolleys,
Switches.

World's Fair, Machinery Hall, Section 26, Column O-30.



J. G. SPEIDEL,
807 & 809 CHERRY STREET,
READING, PA.

Patentee and Manufacturer of the celebrated

Economic Safety Hoist.

500 to 30,000 Lbs. Capacity.

Has been awarded the John Scott Medal and Premium by the Franklin Institute of the City of Philadelphia for Highest Efficiency, Simplicity and Durability.

One man can lift two to three times as fast as with any other self-holding chain hoist. It has two speeds, is built strong and durable, and guaranteed to give satisfaction.

TRAVELING AND SWING CRANES up to 30,000 lbs. capacity and 50 ft. span. Overhead Tramway, with Trolleys, Switches, &c. Elevators and Special Hoisting Machinery. Illustrated Cat. and Prices on application.

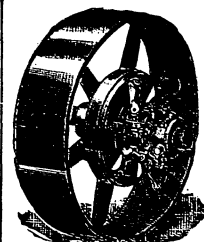
The Moore & White Co.,

Paper

Machinery,

Friction

Clutches, &c.



Clutch Pulley.

N. E. Cor. 15th and LEHIGH AVE.,
PHILADELPHIA, PA.

Our Galvanized Iron

Is made by the Old Process and is "Hand Dipped." It takes on a liberal and tenacious coating, and

Will Not Crack or Flake.

If you Want THE BEST,
TRY IT.

THE CINCINNATI CORRUGATING CO.
BOX Q, PIQUA, OHIO.

Wanted, Contracts

For building mining, blast furnace, rolling mill and factory machinery, for making castings for cable and electric railroads, or any special line of castings. Address

MAHONING FOUNDRY AND MACHINE SHOP

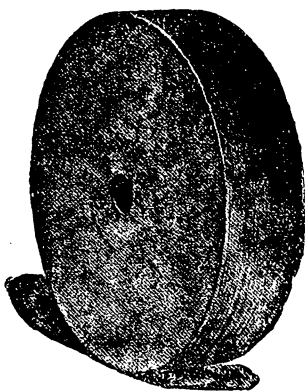
Danville Pennsylvania.

NORTON EMERY WHEEL CO. AT WORLD'S FAIR.

Machinery Hall Annex, Column E-53, Section 10.

NORTON EMERY WHEEL CO., **WORCESTER, MASS.**

Solid Leather Wheels FOR POLISHING.



Will outwear any other wheel
Saves the continual expense of
recovering. Pliable and elastic.
Waterproof and will not burst.

C. E. LE MASSENA & CO.,
776 Broad Street, NEWARK, N. J.

The Best On Earth.

THAT IS WHAT THEY ALL SAY OF
BEREA GRINDSTONE

Of which we are the sole manufacturers.
Send for prices and our Catalogue C, showing
Mounted Grindstones, Scythe Stones, &c.

The Cleveland Stone Co.,
CLEVELAND, O.

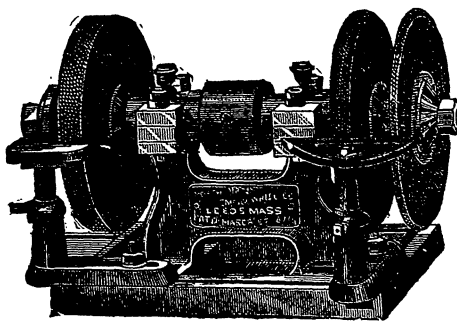
A POOR OIL STONE IS WORTHLESS.



PIKE'S

Lily White Washita is
Warranted to give
satisfaction.

THE PIKE MFG. CO., PIKE STATION, N. H.



ESTABLISHED 1887. CAPITAL \$100,000

Northampton Emery Wheel Co.,
LEEDS, MASS.

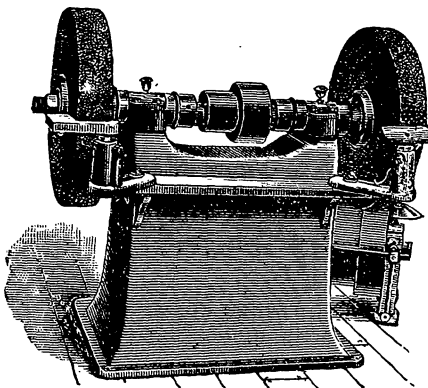
And 20 South Canal St., Chicago,
MANUFACTURERS OF

EMERY WHEELS

—AND—
EMERY WHEEL MACHINERY

Of Best Quality.

Send for Catalogue. FACTORY AT LEEDS, MASS



The Springfield Emery Wheel Co.,
Bridgeport, Conn.

Western Agency, 125 So. Clinton St., Chicago, Ill.

EMERY AND CORUNDUM WHEELS,
To Run WET or DRY.

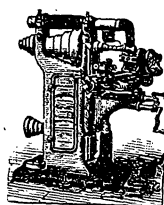
Over 50 Different Sizes of
Dry Grinders,

And over 200 different varieties of Emery
Wheel Machinery. All goods guaranteed
satisfactory.

SEND FOR CATALOGUE.

IT'S TO **Your Advantage** to correspond with
us regarding emery
wheels.

Grant Corundum Wheel Mfg. Co.
WORCESTER, MASS.



The Economy

Of special tools in the machine shop is as yet not considered
at its full value by many machine users. A trial of our Mill-
ing Machines and Grinders would prove to many such that
they had been losing money. Write us about them.

The Cincinnati Milling Machine Co.,

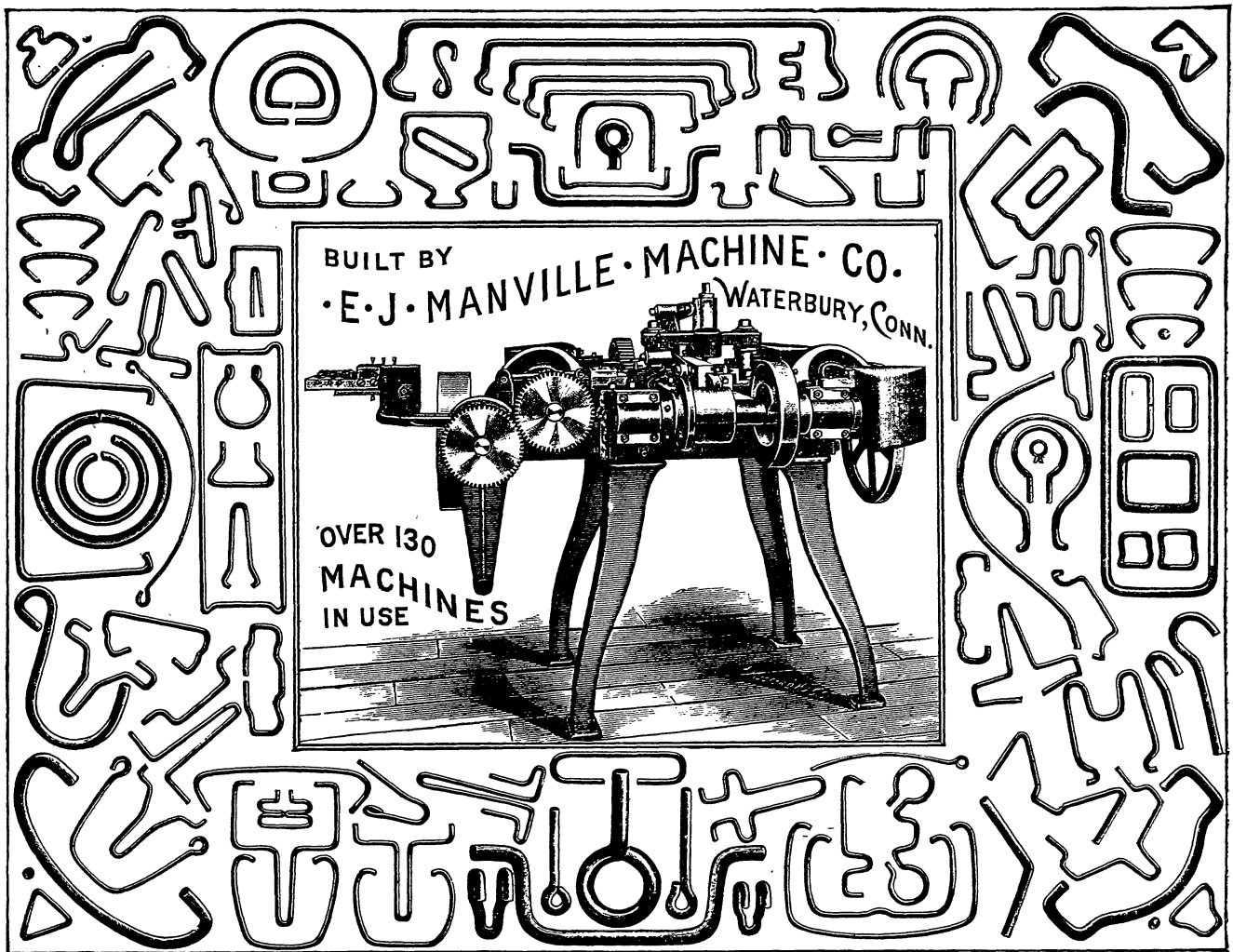
CINCINNATI, OHIO.

FOR NUMBERING AND LABELING
Boxes, Drawers and Shelves
In Hardware Stores and Factories.

Send for sample and description of our Handy
Box of small gummed Letters and Figures, intended
for labeling shelf boxes. Put up especially for the
Hardware trade.

THE TABLET AND TICKET CO., Mfrs.,
87-89 Franklin St. Chicago. 99 Franklin St., New York.

**WILLSON'S
PAPER
LETTERS**



BUILT BY
E. J. MANVILLE · MACHINE · CO.
 WATERBURY, CONN.

OVER 130
 MACHINES
 IN USE

JOHN ADT & SON,

NEW HAVEN, CONN.

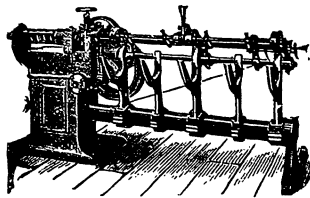
BUILDERS OF

Machinery for Hardware Manufacture.

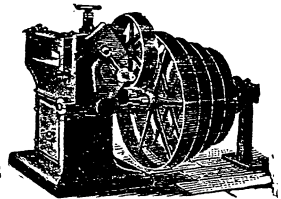
BUTT MILLING MACHINERY,

BUTT DRILLING MACHINERY, RIVETING MACHINES, WIRE
 STRAIGHTENING MACHINERY, FOOT PRESSES,

SPRUE CUTTERS, ETC.



Automatic Wire Straightening and Cutting Machine.



Automatic Wire Straightening and Cutting Machine.

CASH

Will buy machine tools cheaper than ever.
 Write us!

Let us tell you about the latest machine
 tools, especially Turret Lathes.

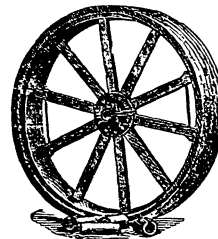
The Lodge & Shipley Machine Tool Co.,

CINCINNATI,

OHIO, U. S. A.

KEASEY PULLEY

Is a Split Pulley. Has narrow Arms. An Iron Hub. Better surface and will transmit more power than an Iron Pulley. To try them is to use no other.



**HAVE YOU
 TRIED THEM?**

If not, do so. It's to your interest.
 Manufactured only by
 The GREAT WESTERN
 PIN CO.,

TOLEDO, OHIO.

GEORGE E. BELL,

Successor to E. M. HYDE and UNION STONE CO.,

—SOLE AGENT—

**Waltham Emery Wheels,
 WALPOLE MILLS TURKISH EMERY.**

Dealer in Platers' and Polishers' Machinery and
 Supplies of all kinds. Foundry Supplies.

36 JOHN ST., NEW YORK.



The Scattergood

Time Record and

Pay Roll Book.

(Pat. Oct. 13, 1891.)

Address for Circular to

HENRY W. SCATTERGOOD,

23 Richmond St., Phila., Pa.

AUCTION. World's Fair.

For the purpose of raising spot cash, we will, in the City of Chicago, on **Wednesday, September 6, 1893,** at 10 a.m., sell at Auction, without reserve, to the highest bidder, our entire stock of New and Second-Hand Machine Tools, **AMOUNTING TO \$200,000.**

The sale to take place at our Chicago Store, Nos. 68 and 70 So. Canal St., and will consist of a complete line of our Standard Engine Lathes, Iron Planers, Shapers, Upright and Radial Drills, Milling Machines, Bolt Cutters, Monitor Lathes, Screw Machines and Brass Working Machinery.

In addition to the Chicago stock, we will at once begin shipping from our warehouses at Cincinnati and elsewhere.

The Tools will be offered singly and the sale will continue until all are sold.

All users of Machine Tools, Dealers and Competitors are cordially invited, and the highest bidder will get the Tools.

☞ Here is a rare chance to make your expenses to the World's Fair.

☞ Lists mailed on application at Cincinnati or Chicago.

**The Lodge & Davis
Machine Tool Co.,
CINCINNATI, O.**

MACHINE & BOILER TOOLS. New and Second Hand.

LATHE, 12 in. x 6 ft., complete, "Star." A1 order. 16 in. x 6 ft., "New Haven," Fair order. Cheap.
" complete, "Wright." Good order. Cheap.
" "Y. Eng. Co." Good order.
" "Heavy Pattern."
" 20 in. x 12 ft., complete, "Pond." Good order.
" 22 in. x 16 ft., complete, "Standard," Heavy Pattern, with all improvements. Good as new.
" 24 in. x 12 ft., complete, "Putnam." Good order.
" 54 in. x 20 ft., complete, Ex. Heavy, modern A1 order.
" 14 in. to 42 in., "Fitchburg's New Pattern."
" 12 in. to 18 in., "Prentiss Bros." Latest Pattern.
" 14 in., 16 in. and 18 in., "Hendey's," Latest Pattern.
PLANER, 22 in. x 5 ft., "Putnam." A1 order.
" 24 in. x 8 ft., "Freeland." Fair order. Cheap.
" 24 in. x 6 ft., "Standard," New Pattern.
" 30 in. x 8 ft., Ex. Heavy, Modern. A1 order.
SHAPER, 42 and 48 in., "Powell, Ex. Heavy.
" 6 in., Crank Motion. Good order.
" 8 in., "Gould. Good order.
" 12 in., "Prentiss." Good order.
" 16 in., Crank Motion, "Gould & Eberhardt." New.
" 22 in. and 26 in., Triple Geared. New.
UPRIGHT DRILLS, 20 to 36 in. swing.
RADIAL DRILLS, 3 to 8 ft. Arms, New Pattern.
MILLING MACHINE, Universal Improved Style. Lincoln Pattern. Good order.
SCREW MACHINE, 1 1/2 in., "Brown & Sharpe," cheap.
GEAR CUTTER, 30 in., "Gould." Good order.
AUTOMATIC GEAR CUTTER, 36 in., "Gould & Eberhardt's." A1 order.
DOUBLE BOLT CUTTER, "National," 1 1/2 in., with Dies.
PUNCH PRESS, several sizes.
BORING AND TURNING MILL, 38 in. A1 order.
VERTICAL TURRET MILL, 30 in., "Brown & Sharpe." A1 order.
BOILER BENDING ROLLS, and 10 ft., Improved Style, with Hinged Housings. Low prices.

J. J. McCabe,
14 Dey St., New York.

Successor to E. P. Bullard's New York Machinery Warerooms.

BARGAINS.

Second-hand Machinery. Good Condition.

1 2500-lb. Double Frame Steam Hammer. Frederick Miles.
1 250-lb Justice & Shaw Dead Stroke Hammer.
1 Iron Planer 32 in. x 32 in. x 11 ft. Double head.
2 Bement Milling Machines.
1 30 in. Boring Mill. Ed. Harrington & Son.
1 Bement Engine Lathe, 18 in. x 10 ft.
1 Niles Turret Lathe, 13 in. x 5 ft.
1 48-in. Drill Press, Back Geared and P. F.
1 40-in. Schumacher Drill Press, B. G. & P. F.
1 28-in. Schumacher Drill Press, B. G. & P. F.
1 Power Punch; capacity, 3/4-in. hole in 3/4-in. iron. Punch to the center 12-in. sheet. Parker, Snol & Co., Fowler patent.
1 20 in. x 48 in. People's Works Horizontal Engine.
6, 8, 10, 15, 25 and 40 H.-P. Holsting Engines.
1 Davidson Steam Pump, 12 in. x 8 in. x 14 in.

L. F. SEYFERT'S SONS,
437-441 N. 3d St., Philadelphia, Pa.

METAL WORKING MACHINERY.

All kinds.

NEW AND SECOND HAND.

600 Machine Tools in Stock.

Send for lists of Second-hand Machinery and Secure Bargains.

PRENTISS TOOL & SUPPLY CO.,
115 Liberty Street, NEW YORK.
59 South Canal Street, CHICAGO, ILL.

PLANER, 28 in. x 26 in. x 8 ft., table. Good order \$350.00
30 in. x 30 in. x 6 ft., with chuck. Re-built 275.00
24-in. Heavy Shifting Belt SHAPER. New 300.00
LATHE, 18 in. x 10 ft., with chuck. Good order. 160.00
40-in. Heavy DRILL PRESS. Good as new 335.00
26-in. Plain 85.00
21 1/2-in. Heavy Lever Feed DRILL. New 54.00
FORG'G DROP, 100-lb. Hammer, New Design. 160.00
WIRE STRAIGHTENER and Cutter, Semi-Aut. 60.00
BOLT CUTTER, New Head and Dies 3/4 to 1 1/2 in. 175.00
7 x 9 ENGINE. Splendid order 85.00
POWER PUNCH PRESSES \$75.00 and upward.
AMER. TOOL WORKS., Cleveland, O.

SECOND-HAND MACHINISTS' TOOLS.

1 Planer, planes 22 ft. 60 in. x 50 in.
1 Planer, planes 15 ft. 42 in. x 42 in.
1 Planer, planes 6 ft. 32 in. x 26 in.
1 Planer, planes 8 ft. 24 in. x 24 in.
1 Planer, planes 5 ft. 30 in. x 24 in., Whitcomb.
1 Planer, planes 5 ft. 24 in. x 24 in.
1 Planer, planes 6 ft. 22 in. x 22 in., old style, cheap.
1 Planer, planes 4 ft. 24 in. x 24 in.
1 Crank Planer, 2 ft. 18 in. x 12 in. A1.
1 Engine Lathe, 18 ft. bed, 32 in. swing, for Boring and Turning.
1 Engine Lathe, 20 ft. bed, 60 in. swing, old style, [cheap].
1 10 ft. 17 in. Lathe.
1 13 ft. 18 in. Lathe Good order.
3 6 ft. 14 in. Blaisdell Lathes.
2 6 ft. 15 in. Wood & Light Lathes.
1 5 ft. 14 in. Star Tool Co. Lathe.
1 Pratt & Whitney Cushioned Hammer.
1 6 ft. Harrington Radial Drill. A1.
2 20 in. Wheel and Lever Feed Drills.
And various other tools.

NEW YORK MACHINERY DEPOT,
Bridge Store No. 16, on Frankfort St., New York.

FOR SALE.

1 each Garvin No. 2 & No. 4 Milling Machines, 2d hand.
1 22 in. x 11 ft. 6 in. Blaisdell Engine Lathe, " "
1 17 in. x 8 ft. McMahon " " "
1 28 in. x 8 ft. New Haven " " "
1 26-in. Post Drill, second hand.
1 each 22 x 8, 10, 12 Engine Lathes, new.
1 each 62-in. and 82 in. Radial Drills, new.
1 each 20 in. "Lever" and "Wheel and Lever" Drills.
1 Baker Bros. Universal Saw Bench, new. [new].
1 Pratt & Whitney Lincoln Miller No. 3, 2d hand.
1 80 in. Radial Drill, 2d hand.

THE LODGE & SHIPLEY MACHINE TOOL CO.,
107-113 Culvert St., Cincinnati, Ohio.

FOR SALE.

Fitchburg Automatic Vertical Engine, 14 in. x 14 in.
Wright Poppett Valve Engines, 16 in. x 38 in. and 12 in. x 32 in. F. McSWEGAN & SONS,
Dover St. and Franklin Square, New York.

GOOD Second-hand TOOLS FOR Quick Delivery.

12 in. x 6 ft. Blaisdell Screw Cutt'g Engine Lathe.
14 in. x 6 ft. Fitchburg " " " "
15 in. x 4 ft. " " " "
16 in. x 6 ft. " " " "
16 in. x 8 ft. " " " "
16 in. x 8 ft. Flather " " " "
16 in. x 8 ft. Dexter " " " "
17 in. x 6 ft. Fitchburg " " " "
17 in. x 8 ft. " " " "
18 in. x 8 ft. " " " "
19 in. x 8 ft. " " " "
20 in. x 7 ft. Flather " " " "
20 in. x 10 ft. Fitchb'g " " " "
20 in. x 9 1/2 ft. Pond " " " "
22 in. x 10 ft. Flather " " " "
22 in. x 16 ft. Fitchb'g " " " "
24 in. x 8 ft. " " " "
27 in. x 12 ft. " " " "

No. 1 Fitchburg Upright Drill, 19 1/2-in. swing.
Prentice Upright Drill, 25 in. swing, back gear, power feed.

No. 3 Fitchburg Upright Drill, 32-in. swing back gear, power feed.

6 ft. Fitchburg Radial Drill.

10 in. x 5 ft. Fitchburg Speed Lathe.

18 in. x 6 ft. " " " "

17 in. x 8 ft. " " " "

18 in. x 6 ft. " " " "

20 in. x 12 ft. " " " "

20 in. x 16 ft. " " " "

36 in. x 6 ft. " Polishing Lathe.

24 in. x 8 ft. " Chucking "

No. 0 Fitchburg Shaper, 12-in. stroke.

36-in. Gould & Eberhardt Gear Cutter.

36-in. Putnam Machine Co. Gear Cutter.

22 in. x 22 in. x 5 ft. Whitcomb Planer.

25 in. x 25 in. x 8 ft. Fitchburg Planer.

28 in. x 26 in. x 10 ft. " " " "

60 in. x 50 in. x 24 ft. " " " two heads on cross beam.

Address

**PENNSYLVANIA
MACHINE CO.,
LIMITED,
29 & 31 N. Seventh St.,
PHILADELPHIA, PA.**

FOR SALE—SECOND-HAND.

3 Upright Corliss Boilers, 150 H.-P. each.
1 Locomotive Fire Box Boiler, 50 H.-P.
1 16 x 36 in. Slide Valve Engine.
1 14 x 42 Greene Engine.
1 16 x 42 Babcox & Wilcox.
Large assortment of Knowles, Blake and Worthington Steam Pumps. Write for prices and full description to
D. B. CRUICKSHANK,
Providence, R.I.

GOOD VALUE.

1 Bausch Radial Drill, 36 in.
1 Gould & Eberhardt Shaper, 16 in.
Above are 2d hand.
1 Hendey Lathe, 21 in. x 10 ft.
1 " " 16 in. x 6 ft.
Above are new.

The Scranton Supply and Machinery Co.,
Scranton, Pa.

Great Bargains

Must be Sold and
Removed.

16 in. x 30 in. Horizontal Engine.
18 in. x 36 in. Horizontal Engine.
24 in. x 36 in. Horizontal Engine.
19½ in. x 48 in. Beam Engine, with
Knowles Condenser.

Write us for what you want.

LOVEGROVE & CO.,

Third and Quarry Sts., Philadelphia, Pa.

SECOND-HAND MACHINERY.

One Belden 100-lb. Upright Power Hammer.
One American Tool Co.'s No. 2 Cabinet Turret Lathe, with slide rest; in fine order.
One Pratt & Whitney 36-in. Gap Chucking Lathe.
One Pratt & Whitney No. 3 Lincoln Milling Machine.
One Iron Planer, 52 in. wide, 44 in. high, 12 ft. long, with two heads.
One Springfield Universal Grinding Machine No. 3, swing 18½ in. over the ways and take 6 ft. between centers. Has been used but a very few times and is practically new.
Send for circular of Second-hand Machinery in stock.

HILL, CLARKE & CO.,

156 Oliver St., Boston, Mass.
12 and 14 South Canal St., Chicago, Ill.

MUST BE SOLD and REMOVED AT ONCE.

The entire equipment of the United Electric Traction Company of Marion, N. J., comprising:

31 Engine Lathes, from 14 in. to 48 in. swing.
15 Hand Lathes, from 10 in. to 20 in. swing.
5 Planers, from 24 in. x 5 ft. to 32 in. x 12 ft.
6 Shapers, from 15 in. to 20 in. stroke.
13 Drill Presses, all sizes up to 32 in. swing.
8 Milling Machines, Plain and Universal.
2 Brown & Sharpe Screw Machines.
1 Large Newton Slotting Machine.
1 Large Radial Drill Press.
3 Gould & Eberhardt Automatic Gear Cutters, 36 in., 48 in. and 60 in.
1 Betts Machine Co. Large Horizontal Boring Mill.
1 No. 2 Diamond Universal Grinding Machine.
2 Large Bliss Power Presses.
Also Tool Grinders, Die Slitters, Tapping Machines, Bolt Cutters, and Large Pattern and Blacksmith Shop Equipments.
Also one 10 H.-P. Baxter engine, with 15 H.-P. Boiler complete. As good as new.
These tools are all in A1 condition and of the very best makes in this country. They will be sold at remarkably low prices, and must be disposed of at once. Call at our salesroom and inspect them, or write for complete descriptive circular and price-list.

THE GARVIN MACHINE CO.,

Laight and Canal Sts., New York.

BLAST FURNACE.

Blowing Engine, made by West Point Foundry. Cyl. 36 in. x 8 ft. stroke, two flywheels 27 ft. diameter, blowing cylinder attached to main piston. Will sell cheap. This is a modern and complete engine.
Address C. W. SCHULTZ & CO.,
308 Walnut St., Philadelphia.

RAILS FOR RELAYING.

50 tons 60-lb. Steel T's, Bethlehem make.
25 tons 45-lb. Iron T's, with chairs, no joints.
50 tons 20-lb. Steel T's. Fine order.

LOCOMOTIVES.

One 20-ton, 36-in. gauge, with tender. Fine.
One 17-ton, 36-in. gauge, saddle tank. Fine.
One 7-ton, 39-in. gauge, saddle tank. New.
One 14-ton, standard gauge, saddle tank.
One 10-ton, standard gauge, saddle tank.
Send for details and prices.

THOS. P. CONARD,

206 Walnut Place, Philadelphia, Pa.

REMOVAL SALE

of all the SECOND-HAND MACHINERY, comprising CORLISS and SLIDE VALVE ENGINES; single and duplex PUMPS, both simple and compound; DYNAMOS, BOLT MACHINES, PULLEYS, SHAFTING, HANGERS and BELTING contained in the five-story buildings Nos. 61-63 Rutgers Slip.

Send for list and prices to

MARVIN BRIGGS,

12 Broadway, New York.

SECOND-HAND MACHINERY.

Boring Mill, 10 ft. 4 in. swing, 56 in. under cross rail, table 7 ft. 6 in. in diameter.

Boring Mill, 8 ft. 4 in. swing, 48 in. under cross rail, table 6 ft. 6 in. in diameter, two heads on cross rail.

76-in. Planer, 13 ft. long; heavy and powerful.

48-in. Car Wheel Borer.
Axle Lathe.

Write for photographs and further particulars.

Eastern Branch,

NILES TOOL WORKS CO.,

138 Liberty St., New York

MACHINERY, TOOLS, &c.

IN STOCK, LARGE LINE OF NEW AND SECOND-hand engines, boilers and machinist's tools for sale or exchange. Below are some special bargains:
60 H.-P. Atlas Automatic engine.
20 H.-P. to 60 H.-P. plain slide valve horizontal engines.
2 H.-P. to 60 H.-P. vertical engines.
2 H.-P. to 10 H.-P. Baxter engine boilers.
6 H.-P. and 10 H.-P. hoisting engines with boilers.
1, 2, 4 and 6 H.-P. yacht engines.
4 H.-P. and 7 H.-P. gas engines.
4 60 H.-P. portable boilers.
60 H.-P. and 100 H.-P. locomotive boilers.
10 H.-P. to 100 H.-P. horizontal and vertical boilers.
20 screw-cutting lathes of different sizes.
Several rod-feed turning lathes.
Milling machines, gear cutters.
6 in., 12 in. and 15-in. shapers.
24 in. and 36 in. planers.
44 in. radial drill, 1¼ National bolt cutter.
No. 3 Fowler press, 2 10 in exhaust heads.
25 lbs. Bradley and 10 lbs. Hotchkiss Hammers.
Catalogues.

FRANK TOOMEY,

131 N. Third St., Philadelphia, Pa.

SOME BARGAINS HERE.

1 Hendey Shaper, 15 in. stroke, imp. vise; new.
1 14 x 6 screw Cutting Engine Lathe; new.
4 H.-P. Comp. Engine and Boiler. Fine condition.
Hendey Cutting-off Machine. New.
1 3-Spindle Garvin Drill Press, used 1 month.
30 x 15 Pond Lathe. Good condition.
72 x 72 x 20 Planer. 2 Cross Heads.
1 75 H.-P. Westinghouse Automatic Engine.
1 26 H.-P. Erie City Boiler; good condition.
Also variety of Engines, Boiler Pumps, &c.
And other machinery, new and second hand. Write for prices.
Machinists' Supply Company,
39, 41 and 43 Central Ave., Rochester, N. Y.

WANTED.

To furnish reasonable estimates on specialties in light metal work.
CLARK & COWLES, Plainville, Conn.,
Manufacturers of Clock Trimmings, Rivets, Springs &c.

Iron Tanks, Hydraulic Press, Corliss and other Automatic Engines, Slide Valve Engines, Boilers, Steam Pumps, etc., etc.

TANKS.—Rendering Tanks, Square Tanks, Round Tanks, and Pans; from Soap Works, cheap before removal.

HYDRAULIC PRESS, 600 to 800 tons, with R. Hoe & Co. Air Pump for same.

CORLISS ENGINES, 30 x 72, 30 x 60, 26 x 48, 23 x 36, 10 x 24, and other sizes; also other Automatic and Slide Valve Engines.

Two WESTINGHOUSE ENGINES, 60 and 25 H.-P.

HORIZONTAL BOILERS, 5½ x 16, 5½ x 14, 5½ x 10, 5 x 18, 4½ x 12, and others. Brennan Crusher, 8 x 25. Bogardus Mill. Ingersoll Rock Drill. Woodward Double Fire Pump, 1000 gallons. Worthington Duplex Pump, 25 x 12 x 24. Four-side Wood Planer and Matcher. Also assortment of Steam Pumps.
Send for catalogue.

C. M. CLAPP, 74 Cortlandt St., N. Y.

!!! FOR SALE !!!

BAKER BLOWERS, Nos. 1, 4½, 5, 6 and 7.
ROOT BLOWERS, Nos. 1, 2, 3, 4, 5, 6 and 7.
Sturtevant Blowers, Nos. 4, 5, 6, &c.
1 Corlies Band Wheel, 12 ft. x 24 in. in halves.
A Variety of Machinery, Such as Boilers, Engines, Pumps, Crushers, &c., very cheap.
Do you want to buy or sell Machinery? If so, write
C. R. BIGELOW, Machinery Expert,
45 Dey St., New York City.

16 INCH FLAT MILL.

For sale cheap. Made by Garrison & Co., Pittsburgh; complete and modern; 3-roll high, flywheel 20 tons, 5 sets Housings, pinions, rolls, bedplates, &c., in perfect condition. Address

G. W. SCHULTZ & CO.,
308 Walnut St., PHILADELPHIA.

MACHINE TOOLS, New and Second-hand, For Sale.

Hendey's "Norton" Screw Cutting Lathes. Cut 12 threads without changing any gears. 36 speeds for the side feed.
Garvin Screw Machines.
Dwight Slat Sensitive Drills.
A line of second-hand Tools, also small Electric Fan Motors.

DANIEL KELLY,

51 N. 7th St., Philadelphia, Pa.

EVERYTHING

even second-hand is marketable somewhere. If you wish to **SELL** or **BUY** Machinery, Supplies, Manufactured Products, Special or Job Lots, write me, as I am always ready for a trade. Send for list.

H. H. MANSFIELD,

126 Liberty St., New York.

For Sale, Cheap LOCOMOTIVES AND CARS.

Standard and narrow gauge boarding, box, coal, flat, refrigerator and passenger Cars. Also large quantities of relaying and scrap rails, car wheels and scrap, pig iron, muck bars, &c.

G. H. SIBELL & CO.,

62 and 64 Michigan Ave., Chicago, Ill.

BOILERS AND SHEARS FOR SALE.

Two Tubular Boilers, 48 in. diameter, 16 ft. long, with fronts, grate bars and fittings complete. Also one Double Deck Tubular Boiler, without settings. All guaranteed for 90 lbs. steam. 1 large lever Plate Shear, cutting to ¾ in. plate. 1 Rotary Trimming Shear, will cut 3-16 in. Apply to

MARSHALL BROS. & CO.,

1156 Beach St., Philadelphia, Pa.

Any Company

contemplating the expenditure of a large amount in the establishment of a manufacturing industry, requiring the use of a thoroughly equipped Machine Shop, Boiler Shop, Foundry and Smith Shop plant, well located on competing trunk lines of railroads and in a good labor market, is invited to address

STIMSON, WILLIAMS & CO.,

Bryant Building, 55 Liberty St., New York

Assignee's Sale.

ASSIGNEE'S SALE.—The undersigned, Assignee of the Roelker Stove and Plow Co., of Evansville, Indiana, by order of the Superior Court of Vanderburgh County, Indiana, will, on the **SIXTH DAY OF SEPTEMBER, 1893**, on the premises of said company, on Main and Sycamore streets, between Fifth and Sixth streets, commencing at 10 o'clock a.m., and continuing until all said property is disposed of, sell all the real and personal property of said corporation, consisting of plows, stoves, castings, patterns, flasks, tinners' stock, raw material for the manufacture of stoves and plows; also all tools and machinery used in the manufacture. The above property will be sold for CASH.

The property to be sold is one of the best equipped plants for the manufacture of stoves and plows in the West. The buildings have been erected and machinery placed with especial reference to the business, and everything is in perfect condition to continue the business.

The Roelker Stove and Plow Co. is widely and favorably known and its stoves and plows are in great demand—a purchaser could not only purchase a thoroughly equipped plant, but could also secure the good will of a thoroughly advertised business of thirty-eight (38) years' active operation. The property will be sold at public auction to the highest bidder. If purchaser cannot be found for the entire plant, then it will be divided and sold in such quantities as may secure the best returns.

No better opportunity was ever offered for a profitable investment.

In the meantime propositions will be received for private sale of all or part of above described real estate, and also for either or both the stove and plow manufacturing business, with all its manufactured stock, raw material, patterns, machinery, tools, &c., connected with the above-named business. Address

JOHN H. POLSDORFER,

Assignee,

Evansville, Ind.

Collections?

ATTENTION! Merchants and Manufacturers.—We collect your past due accounts. Do not let them remain too long upon your books. Our terms just and fair.

THE HARDWARE BOARD OF TRADE, Ltd.
4 and 6 Warren street, New York.
JAS. H. GOLDEY, Treas.

Any Manufacturer

of Hardware or Machinists' Specialties desiring to be represented in New York City and vicinity, will find it to his interest to address

E. J. HUSSEY & CO.,

86 John St., New York.

We are centrally located, active workers and can furnish best of references.

Hardware Stock For Sale.

A \$4000 stock in a fine manufacturing town with a population of about 6000. Annual sales \$35,000. Tin shop in connection, with large factory trade and telephone connections with all factories and Chicago. This is one opportunity in a lifetime. Terms cash. If you want a bargain address "D," office of *The Iron Age*, 59 Dearborn St., Chicago, Ill.

BLOWING ENGINE FOR SALE

Vertical pattern, with balanced steam slide valve gear, steam cylinder 14 in. diameter, air cylinder 40 in. diameter, stroke 24 in. 1 to 100 strokes per minute; engine new.

JAMES LEFFEL & CO., Springfield, Ohio.

C. F. RICE,

206 So. Green St., - - CHICAGO.

Largest wholesale house in America for Mirrors of all kinds, Pictures, Mouldings, Frames, Brackets, Easels, Screens and kindred goods. Large illustrated catalogue sent to Dealers upon application.

ATTRACTIVE AUCTION TRADE SALE OF CUTLERY.

E. Bissell, Son & Co.,
WHOLESALE AUCTIONEERS.

Wednesday, Thursday and Friday, Aug. 23, 24 and 25, at 10 o'clock each day.

At Nos. 12 Murray St., and
15 Park Place, New York.

LARGE SPECIAL AND PEREMPTORY
TRADE SALE OF

Table and Pocket Cutlery, Carvers, Butcher Knives, Silver Plated Ware, Scissors, Shear, &c., &c.

THIS SALE WILL COMPRISE:

Several thousand dozen of table medium and dessert knives and forks and knives only—desirable patterns direct from the manufacturers. Also a large line of fine carvers with stag, celluloid, rubber, ebony, bone, cocoa and pearl handles.

Several thousand dozen butcher knives, silver plated tea and table spoons and forks, steel medium knives, extra and triple plated on 18 per cent. nickel silver.

Several hundred dozen pocket knives, cast-steel nickel-plated scissors and shears, &c., &c. The assortment of goods to be sold at this sale will be very large and desirable and well worthy of the attention of the jobbing and retail trade.

Catalogues will be sent to parties who desire them as soon as ready.

WANTED.

Several large Band Wheels or Pulleys second hand, 5, 8 and 9 feet diameter. State lowest price, with sizes, &c.

C. W. SCHULTZ & CO.,
308 Walnut St., Philadelphia.

WANTED.

An energetic General Agent to develop in the United States and Southern ports the trade for a high grade Wire Rope of prominent Manufacture. Only those having had experience need apply. Address

"F. & G.," Box 209,

office of *The Iron Age*, 96-102 Reade street, New York.

CHARLES WEILAND.

I make a special business of buying and selling Job Lots of

HARDWARE AND CUTLERY.

Tools and Second Quality Files a Specialty.

Send for Catalogue,

143 Chambers St., New York.

IF YOU WANT A NIAGARA DYNAMO OR MOTOR

or if you are a dealer and want an Agency send for our Catalogue and Price-List.

LOYELL MFG. CO., LTD., ERIE, PA.

TO LET.

Large corner Store in good factory neighborhood, suitable for hardware or general supply store. Rent reasonable.

602 WEST 52d ST., NEW YORK.

THE LATEST BOOKS.

Lectures on Sanitary Law. By A. WYNTER BLYTH. 8vo, cloth.....\$2.50

Directory of American Gas Companies. By C. E. BROWNE. Gas Statistics. 7th year. 8vo, cloth.....\$5.00

Portable Electricity: Being a Treatise on the Application, Methods of Construction and Management of Portable Secondary Batteries. By J. T. NIBLETT. Fully illustrated. 8vo, cloth.....\$1.00

The Progress of Marine Engineering, from the Time of Watt to the Present Day. By THOS. MAIN. 67 illustrations. 12mo, cloth.....\$3.00

Plumbing, Drainage, Water Supply and Hot Water Fitting. By JOHN SMEATON. 222 illustrations. 8vo, cloth.....\$3.00
Contents: Introduction; drainage; danger from city wells; external plumbing; internal plumbing and fittings; sanitary plumbing; water service, and tapping of mains under pressure; water supply; ornamental leadwork; heating; hot-water work; index.

Electrical Distribution. By M. H. KILGOUR, H. SWAN and C. H. W. BIGGS. Its Theory and Practice. 174 illustrations. 12mo, cloth.....\$4.00

The Plumber and Sanitary Houses. By S. S. HELLYER. 5th edition. Royal 8vo.....\$5.00

Plate Girder Construction. By ISAMI HIRORI, C. E. Revised Edition. 16mo, cloth. New York, 1893 (Van Nostrand's Science Series No 95).....50c.

The Electric Transmission of Intelligence. By PROF. E. J. HOUSTON. And other Advanced Principles of Electricity. 88 illustrations. 12mo, cloth.....\$1.00

Varnishes, Lacquers, Printing Inks and Sealing Waxes: Their Raw Materials and Their Manufacture. By W. T. BRANNT, to which is added the art of varnishing and lacquering, including the preparation of putties and of stains for wood, ivory, bone, horn and leather. 336 pages with 39 engravings. 12mo, cloth.....\$3.00

A Treatise on Shoring and Underpinning. By C. H. STROCK. 2d edition. 60 pages, 8vo.....\$1.75

Knots, Splices, Hitches, Bends and Lashings. By F. R. BRAINARD. Illustrated and described. 76 pages, 16mo, cloth.....\$1.00

How to Use Electrical Measurement Apparatus. By CHAS. P. FREY. A Manual of Practical Information Relating to Electrical Testing. Illustrated. 8vo, paper.....50c.

A Handbook on the Steam Engine. By HERMAN HAEDER, C. E. With especial reference to Small and Medium sized Engines. For the Use of Engine Makers, Mechanical Draftsmen, Engineering Students and Users of Steam Power. English Edition, Re-edited by the Author from the Second German Edition, and Translated with considerable Additions and Alterations by H. H. P. POWLES, A. M. Inst. C. E. 12mo, cloth. 450 pages, and nearly 1100 illustrations. Cloth.....\$3.60

The Manufacture of Liquors and Preserves. By J. DE BREVANS. 65 illustrations and 18 Tables. 12mo, cloth.....\$3.00

Twenty Years' Practical Experience of Natural Asphalt and Mineral Bitumen. By W. H. DELANO. Illustrated. 12mo, parchment.....50c

Steamships and Their Machinery; from First to Last. By J. W. C. HALDANE. Plates and Illustrations. 8vo, cloth.....\$6.00
Contents: Works and Their Machinery—Shipbuilding—Design and Construction of Engines and Boilers—Also Auxiliaries for Hoisting, Steering, Refrigerating, Electric Lighting, Etc.

The Dynamo, Its Theory, Design and Manufacture. By C. C. and F. WALLIS HAWKINS. 190 illustrations. Thick 12mo, cloth. (The Specialists' Series).....\$3.00

Practical Dynamo Building. By L. C. ATWOOD. With Detail Drawings and Instructions for Winding. Giving correct sizes of Wire, Dimensions of Iron, etc. etc., also Diagram for House Wiring. Illustration and Plates. 4to, cloth.....\$3.00

The Dynamo, How Made and How Used. By S. R. BORTONE. Eighth edition, with additional matter and illustrations. 12mo, cloth.....\$1.00

Warm Air Furnace Estimate Book. By DANIEL P. HOLMES. Cloth.....50c

Metal Plate Work. Its Patterns and Their Geometry, also notes on metals and rules in mensuration for the use of tin, iron and zinc plate workers, &c. By C. T. MILLIS. Second edition, revised and enlarged. 377 pages, 314 illustrations, 12mo, cloth.....\$3.50

Practical Talks on Drawing for Engineers, Machinists, Mechanics, Students of Trade Schools and Technical Colleges. By T. P. PEMBERTON. Profusely illustrated. 400 pages, 12mo, cloth.

Public Health Laboratory Work. By HENRY R. KENWOOD, M.B. Including Methods Employed in Bacteriological Research, with special reference to the Examination of Air, Water and Food, contributed by ROBERT BOYCE, M.B. Illustrated. 12mo, cloth.....\$3.00

The Annual Statistical Report of the American Iron and Steel Association for 1893. 104 pages, 8vo.....\$3.00

Dynamos, Alternators and Transformers. By G. D. KAPP. Giving an exposition of the general principles underlying the construction of dynamo-electric apparatus without the use of high mathematics and complicated methods of investigation. 12mo, cloth.....\$4.00

The Heating of Large Buildings. By A. R. WOLF. Illustrated, 8vo, paper.....\$ 25

Sent, postpaid, on receipt of price by

DAVID WILLIAMS, Publisher and Bookseller,

96-102 Reade Street, New York.

SITUATIONS WANTED.

Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

SUPERINTENDENT or Chief Engineer by a mechanical engineer of 15 years' experience in hydraulic machinery, structural work in iron and steel, installation of plants, transmission of power, cranes, &c.; acquainted with modern methods of construction and shop practice. "WORKER," office of *The Iron Age*, 96-102 Reade St., New York.

BY A THOROUGH ACCOUNTANT of 20 years' experience with iron and steel manufacturers; understands perfectly voucher system of keeping accounts and arriving at costs of manufacturing; good reasons for wishing to change and references from present employers; am forty years of age and married. Address "ACCOUNTANT," Box 817, office *The Iron Age*, 96-102 Reade St., New York.

HARDWARE SALESMAN, now representing one of the largest Eastern jobbers, 12 years' experience traveling Southern trade, is anxious to locate, and seeks engagement with a live firm as salesman or Assistant Buyer; highest references as to ability and character. Address "KENNASHAW," Box 16, Atlanta, Ga.

SOLE AGENCY in England wanted of suitable machinery and tools by an engineer in Birmingham; show room opened if necessary; first-class references. Address **JOSIAH WALSHAM**, C. E., 14 Willis St., Birmingham, England.

FOREMAN PATTERN MAKER wants situation; for 11 years foreman for the V. and T. Company. Address "FOREMAN PATTERN MAKER," office of *The Iron Age*, 96-102 Reade St., New York.

POSITION with a large hardware manufacturing or jobbing house where an opportunity is offered for advancement, seven years' experience in hardware business and not afraid of work; can furnish high references. Address "FIDELITY," office of *The Iron Age*, 96-102 Reade St., New York.

FOUNDRY FOREMAN; a man with 15 years' experience as such desires to make a change, where sobriety and push will be appreciated; all references as to ability and reliability; distance no object. "PUSH," Box 817, office of *The Iron Age*, 96-102 Reade St., N. Y.

AS IRON MOLDER FOREMAN of some years' experience; well up in ornamental, light and heavy castings in green and dry sand molding; I am temperate in habits. Address **A. MITCHELL**, 384 Fulton St., Chicago, Ill.

SYSTEM OF COSTS.—The advertiser, having had ten years' experience in keeping cost accounts, will be glad to correspond with any large firm with a view to furnishing details whereby the cost of each class of article produced and the monthly approximate profits and losses can be arrived at. With so much competition, it is absolutely necessary to have means of ascertaining in what department profits or losses exist. Address "C. A.," Box 817, office of *The Iron Age*, 96-102 Reade St., New York.

MAN OF ABILITY to manage shop, any class of manufacturing; am a first-class mechanic; have had experience as manager and general foreman in various manufacturing enterprises; good references. Address "SHOP MANAGER," office of *The Iron Age*, 96-102 Reade St., New York.

BOOKKEEPER.—A young man, 38 years of age, having had 20 years' experience as bookkeeper in different lines of business, including banking, desires a position where ability is necessary; is an able financier a thorough accountant and is well versed in the iron business and can furnish the best of references; willing to go to city or country. Address "BOOKKEEPER," office of *The Iron Age*, 96-102 Reade St., New York.

DRAFTSMAN and Designer desires opening; 27 years old, technical graduate, Junior member A. S. M. E.; shop practice; four years draftsman; experienced in designing light automatic machinery. Address Box 431, Elgin, Ill.

ADVERTISER is desirous of negotiating with a jobbing hardware house with a view of obtaining position as Buyer or Assistant Buyer; have had many years' experience as buyer for one of the largest houses in the West and have a thorough knowledge of the business; can give best of references. Address "HARDWARE BUYER," office of *The Iron Age*, Bank of Commerce Building, St. Louis, Mo.

PRACTICAL wire mill Superintendent and Galvanizer; thoroughly understands drawing, annealing and galvanizing wire of every kind—copper, iron and steel; screw and spring wire a specialty; can give plans of the latest galvanizing furnaces, also charcoal fires for making charcoal screw wire. Address "CHARCOAL," office of *The Iron Age*, 96-102 Reade St., New York.

STENOGRAPHER and bookkeeper, five years' experience in coal and iron business, thoroughly acquainted with all branches of office work and voucher system, desires permanent employment of like character in good locality after October 1st; best references furnished; age 22. Address "STENO," office of *The Iron Age*, 96-102 Reade St., New York.

AS SUPERINTENDENT or assistant of iron or steel mill; have had over 20 years' experience as such; fully understand puddling and all other branches; have built several mills, all running successfully; would accept position as foreman of any department; best of references. Address "SUP'R OR ASS'T," office of *The Iron Age*, 96-102 Reade St., New York.

TRAVELING SALESMAN, about 21 years' old, is open for position traveling for a first-class hardware jobber or manufacturer who wants a wide-awake man September 1; three years' experience traveling, calling on hardware dealers in Western New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin and Michigan; reference, former firm. Address Box No 38, Wilbraham, Mass.

BY PRACTICAL pattern maker with a good firm; can give good references. Address **C. H. LEWIS**, 211 Genesee St., Utica, N. Y.

HELP WANTED.

Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

TRAVELING SALESMAN, calling on the retail hardware, stove, tinware and house-furnishing trade in the South, West and Northwest especially, to sell goods for a reliable manufacturer as a side line; no samples. Address **MCNEILL**, office of *The Iron Age*, 312 The Cuyahoga, Cleveland, Ohio.

MANUFACTURERS' AGENTS, who are permanently located in all the large cities in the country, to sell the goods of a reliable manufacturer. Address "MANUFACTURERS," office of *The Iron Age*, 312 The Cuyahoga, Cleveland, Ohio.

PRACTICAL Drop Forgemaster; one who thoroughly understands about drop hammer and upsetting machines and can take full charge of factory employing from 25 to 30 hands, good position is open to the right man. Address "DROP FORGE," office of *The Iron Age*, 96-102 Reade St., New York.

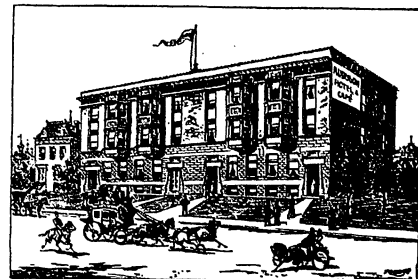
A THOROUGHLY competent Superintendent for large bridge works; none need apply not holding similar position; state fully your age, capabilities and send copy of references, which will be confidential; state salary; works are in Eastern Pennsylvania. Address "BRIDGE SUPERINTENDENT," office of *The Iron Age*, 96-102 Reade St., New York.

GOOD SALESMEN all over the United States and Canada, visiting the retail hardware dealers and general stores in the smaller towns, to sell saable specialties in the builders' hardware line on commission for an old and well-known manufacturing concern. Address, with references, "S. T. W.," No. 810, office of *The Iron Age*, 96-102 Reade St., New York.

A SALESMAN for Babbitt and anti-friction metals; a good opening for a hustler. Address "L. & H.," office of *The Iron Age*, 96-102 Reade St., New York.

A MANUFACTURER of Cutlery Specialties desires to place his samples in the hands of a first-class salesman having large acquaintance with retail trade of New York State. Standard goods. Liberal commission. Address "CUTLERY SPECIALTIES," office of *The Iron Age*, 96-102 Reade St., New York.

EXPERIENCED SALESMAN on liberal commission for Ohio, Indiana, Illinois and Michigan, to sell a line of extra finished hollow ware from factory. Address **HEESSEN BROS. & Co.**, Tecumseh, Mich.

AUDUBON HOTEL.

Midway Plaisance and Oglesby Ave.

Where shall I Stop
When I Visit the Fair?
AT THE AUDUBON.
WHY?

It is convenient.
It is new and clean.
It is comfortable.
It is safe.
It is reasonable in charges.
It has refined patronage.
It has fine cafe service.
It has ample toilets and baths.
It has an entrance to the Fair one block away.
It is where the Hardware, Iron and Metal men go.

ROOMS \$1.00 PER DAY and up.

Send for catalogue with diagrams of floors and write for engagements without advance payment to

N. H. HENCHMAN, Jr., Mgr.,
6032 Oglesby Ave., Chicago.

Montross & Coolidge, Props.

REFERENCES: Markley, Ailing & Co., Orr & Lockett Hardware Co. Commercial National Bank.

KEEP BOOKS

by WEST'S New Original-ENTRY LEDGER.

Make the same entry but once. A Ledger in place of a full set of books. Convenient forms for all entries. Easily applied, simple, saves time. West's Self-Proving Balance locates every error. Send 5 2-cent Stamps for illustrated 16-page pamphlet.

WOLCOTT & WEST, Syracuse, N. Y.

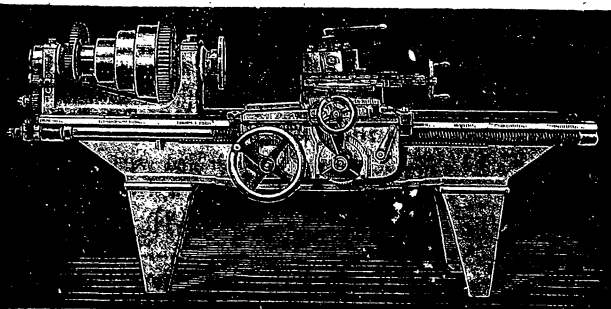
WRITE FOR OUR
1893 Catalogue.

THE GARVIN
MACHINE CO.,

Laight and Canal Sts., New York, N. Y.

Mailed free to any address.

NEW TOOLS. REDUCED PRICES.



TURRET
MACHINES
LATHES,
MILLING
MACHINES,
SPECIAL
MACHINERY,

JOHN L. BOCERT, FLUSHING, N. Y.

HENDRICKS'
ARCHITECTS AND BUILDERS' GUIDE
 —:AND:—
CONTRACTORS' DIRECTORY
OF AMERICA
 —:FOR:—
BUILDERS, CONTRACTORS, MANUFACTURERS
 AND DEALERS IN ALL KINDS OF
BUILDING SUPPLIES.

A Complete Directory of all the Construction Industries of the Country, containing over 170,000 Names. Addresses and Business Classifications, comprising Builders and Contractors of Material and Construction in the Building and kindred Industries. With Full lists of the Manufacturers of and Dealers in Everything employed in the Manufacture of Material and Apparatus used in these Industries—from the Raw Material to the Manufactured Article, and from the Producer to the Consumer.

Architects; Arch'l Wood Workers; Car Builders; Carpenters; Builders and Contractors of all kinds; Blast Furnaces; Brick Mfrs. (Common, Fire, Ornamental, Paving, Pressed, &c.); Boiler Mfrs.; Bridge Builders; Builders' Hardware; Mfrs. of Building Iron of all kinds; Cement; Cornices; Dumb Waiters; Engine Mfrs.; Engine and Boiler Dealers; Electric Light ng Co.'s Dynamos and Motors; Elevators; Engineers (Civil and Mechanical) Electricians; Fire Escapes; Furnaces; Fire Proof Building Material; Dredging Machinery and Contractors; Dock Builders; Contractors for Railroads (Steam, Electric, Elevated, Cable, Street, &c.); Granite Producers, Dealers and Workers; Granite and Marble Monument Workers and Dealers; Iron and Steel Ceiling and Siding; Iron and Steel Roofing; Lathing (Iron, Steel and Wire); Lightning Rods; Mantel Mfrs. (Iron Marble, Onyx, Slate, Wood, &c.); Mantels, Grates, Fenders, Tile, &c; Marble Producers, Marble Dealers and Workers; Mason and Builders' Materials; Paint Mfrs.; Paint, Oil and Glass Dealers; Plumbers' Specialties; Plumbers, Gas and Steam Fitters; Plumbers' Gas and Steam Fitters' Supplies; Roofers and Roofers' Supplies; Steam Supplies (Gauges, Feed Water Heaters, Traps, Valves, Pipe and Boiler Coverings, Cast and Wrought Iron Pipe and Fittings); Steam and Hot Water Heating Apparatus; House Heating Boilers and Heaters; Steam and Hot Water Heating Contractors; Railroad Purchasing Officials; Radiators; Rolling Mills, &c.; Sashes, Doors and Blinds; Skylights; Stone Dealers; Terra Cotta; Varnishes; Ventilators; Vault and Sidewalk Lights; Weather Vanes; White Lead Mfrs.; Wire Mfrs. and Workers; in fact everything connected with the Building Industries.

FOR THE YEARS 1893-94.

PRICE . . . FIVE DOLLARS.

Suburban and Country Homes.

Containing Forty-Five Plates showing designs for houses of moderate cost, with descriptive letterpress, contributed by various architects, together with the following articles: "Suggestions on House Building." By ALBERT WINSLOW COBB, Architect; and "How to Plumb a Suburban House Safely, Economically and Effectively," together with Plans and Specifications. By LEONARD D. HOSFORD.
 Cloth, 10 x 12 inches, \$3.00.

The many attractive towns adjacent to our great cities illustrate the thought and skill that is now being brought to bear in regard to the planning and designing of our suburban homes. In preparing this book the object has been to present to the intending builder the necessary information and steps to follow so that the best results might be attained. The designs shown represent the efforts of nineteen architects who have made a special study of the subject. Each design is fully described and accompanied by elevations and plans. In many cases the cost given is the actual amount of contract. In others estimates and in some bills of material are given.

Cottages; or Hints on Economical Building.

Compiled and edited by A. W. BRUNNER, Architect; 24 plates, contributed by different New York architects, and 54 pages of text; 6 x 9 inches, cloth, \$1.

A number of designs and sketches are presented in this little book of medium and low cost country houses adapted to meet the ideas of those wanting inexpensive homes, which at the same time shall be picturesque and convenient. The first four plates show designs of very simple cottages of from four to six rooms, costing from \$800 to \$1000. In plates V to X the designs embrace cottages of slightly larger size, with three rooms on the first floor, the estimated cost not exceeding \$2000. Plates XI to XIX include various designs, all differing greatly in plan and exterior treatment, yet keeping strictly within the range of medium-cost houses. The last four plates give designs for double or semi-detached houses. The descriptive text includes practical suggestions for cottage building. A chapter by Wm. Paul Gerhard is added upon the water supply, drainage, sewerage, heating, ventilation and other sanitary questions relating to country houses.

Sent, post-paid, on receipt of price, by

DAVID WILLIAMS, - - - Publisher and Bookseller,
 96-102 Reade Street, New York.

F

THE STEEL AND IRON IMPROVEMENT CO.,

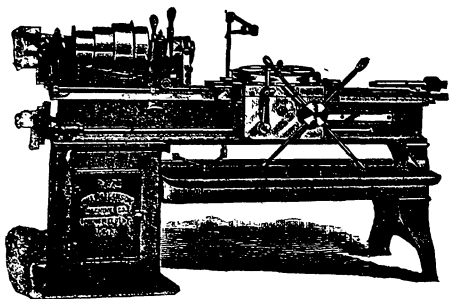
Controlling the Adams-Blair Process and other Steel and Iron Patents.

High Grade Open Hearth Steel produced by the Adams-Blair Process at less than the Cost of BESSEMER Steel.

91 and 98 Fifth Ave., Pittsburgh, Pa.

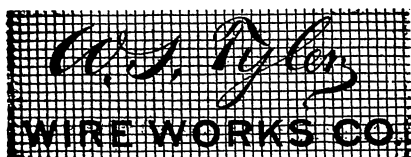
EASTERN OFFICE: 412 Drexel Building, Philadelphia, Pa.

2 BY 24 FLAT TURRET LATHE.



SEND FOR CATALOGUE FOR '92.

Jones & Lamson Machine Co.,
SPRINGFIELD, VERMONT, U. S. A.



MANUFACTURERS OF

Extra Heavy Double Crimped Wire Cloth
FOR STAMP BATTERIES.

Steel, Iron, Brass and Copper Cloth for Coal and Ore
Screens, Flour Mills, Paper Mills and Maltsters

W. S. TYLER, Pres. PROCTOR PATTERSON Sec. & Treas.
CLEVELAND, OHIO.

ANALYTICAL
AND ASSAY

LABORATORIES

—OF—

DR. GIDEON E. MOORE

221 PEARL ST., (Corner Platt St.,) NEW YORK.

Assays of Ores, Metals and Metallurgical Products of every description.
Analysis of Water, Ores, Minerals, Metals, Fuel, and Natural and Industrial Products generally.

PRINTED PRICE-LIST ON APPLICATION.

ALUMINUM.

The Pittsburgh Reduction Co.,

116 Water St., Pittsburgh, Pa.,

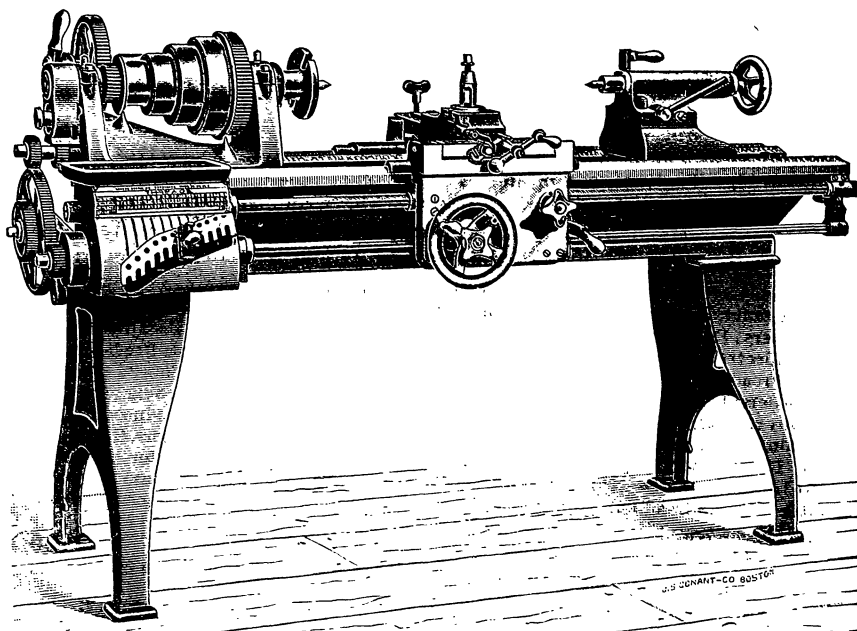
Offer Aluminum guaranteed equal in purity to the best in the market, at lowest rates obtainable.

**ALUMINUM SHEET, WIRE,
AND CASTINGS.**

The Norton Improved Screw Cutting Engine Lathe,

—MANUFACTURED BY—

The Hendey Machine Co., Torrington, Conn.



This lathe cuts 12 threads, viz: 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18 and 20, without changing gears. It also makes 12 different cuts for turning, viz: 30, 35, 40, 45, 50, 55, 60, 65, 70, 80, 90 and 100 cuts per inch.

These various threads for screws, and nuts for turning, cover everything called for in every-day work. Other changes of gear can be made, and each additional change will give 12 additional screws or cuts per inch. The simplicity of the lathe makes its most valuable feature and we fully guarantee it in every way. Send for descriptive circular, and mention *The Iron Age*.

London Agents, **CHARLES CHURCHILL & CO., 21 Cross St., Finsbury, London, E. C.**

DO YOU BORE CYLINDERS?

THE HORIZONTAL BORING MACHINE

IS A SPECIAL TOOL FOR THIS PURPOSE.

SEND FOR PARTICULARS TO

NEWARK MACHINE TOOL WORKS

NEWARK, N. J.

J. A. FAY & Co., CHICAGO, WESTERN AGENTS.

5-Mile National Championship

—WON BY—

JOHN S. JOHNSON, on his

Stearns Racer,

At Chicago, August 9th.

F. H. TUTTLE, also on a Stearns, took third place in same race.

E. C. Stearns & Co., Syracuse, N.Y.

HOT?

Well probably you are. We have'nt got time to be. Our **KUT** **PRICES** on Lamp Stoves have made our competitors

RED HOT

HANDLE THE

B.&B.

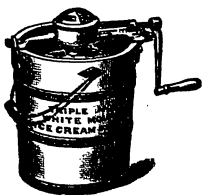
LAMP STOVES,
COOK STOVES,
OIL HEATERS,

and see what a cooling effect your greatly increased profits will produce. **Kut Prices** on *Lamp Stoves, Oil Cook Stoves and Oil Heaters.*

Ask for **Katalogue and Kut Prices.**

The Glazier Stove Co., Mfrs., **CHELSEA, MICH.**

W. W. MONTAGUE & CO., San Francisco, Cal., Agents for the Pacific Coast.



The standard by which the merits of a Freezer are gauged is, how near it comes to being as perfect as the

WHITE MOUNTAIN ICE CREAM FREEZER.

It always has been, and is still, the best. Try them.

—MANUFACTURED BY—

THE WHITE MOUNTAIN FREEZER CO., - - Nashua, N. H.



THE OLD RELIABLE STANDARD FREEZER

has the reputation of being the BEST ICE CREAM FREEZER ever introduced. **STRENGTH, DURABILITY, NEATNESS AND EFFICIENCY** are prominent points in the manufacture. Full Size Can, CEDAR TUB, Detachable Hinged Crossbar, Self-adjusting Vibratory Scraper, etc.

Write for Illustrated Circular, Price-List and Discounts of **STANDARD, GOOD LUCK, MODEL and MACHINE Freezers.**

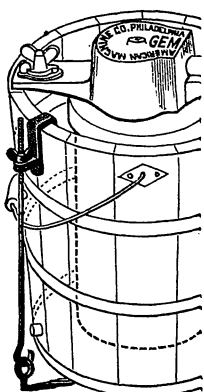
CHAS. W. PACKER, Mfr.,

20 North Fourth Street, - Philadelphia

SEASONABLE SPECIALTIES,

Manufactured by **NORTH BROS. MFG. CO.,**

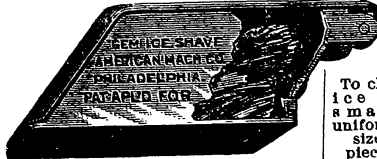
American St. and PHILADELPHIA, Pa., U. S. A.
Lehigh Ave.,



**GEM
FREEZER
CLAMPS,**

To hold
Freezer
firm while
freezing.
Made in
various
sizes to
suit any
Freezer.

LIST PRICE
\$3.00 per
doz. pairs.



GEM ICE SHAVER

For shaving ice from block in refrigerator for cooling water, wines, fruits, oysters, &c., and use at Soda Fountains, Restaurants, and Bar Rooms.

LIST PRICE, \$6.00 per doz.

Descriptive Circulars, Catalogs and Discounts to Trade sent on Application.

Crown Ice Chopper.

LIST PRICE, \$6.00 per doz.



To chip
ice in
a mail,
uniform
size
pieces
to use in
all Ice
Cream
Freezers
Will re-
duce a 20
lb. block
ice in a
few min-
utes.

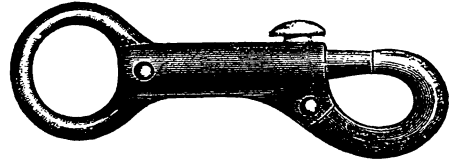
Discounts
to
Dealers.



BARGAINS IN BICYCLES.

Write for latest list and catalogue free. **Sylphs, Overlands and Ridges** of our own manufacture on favorable terms to the trade. **Western Wheel Works' Cycles** of which we are largest Western jobbers at Bed-Rock prices. Positively 20 to 60% saved on many styles. The low prices and high quality of our goods will surprise you. Don't miss it. Write now. Cycles sold on easy payments. **ROUSE, HAZARD & CO.,** 146 G St., Peoria, Ill. Manufacturers, oldest and largest jobbers in U.S.

THE BANNER BOLT SNAP.



This snap has many important advantages over other makes of Bolt Snaps, viz.: It is lighter, the spring is entirely covered and protected from foreign substance and freezing, and is lower in price.

Made in all sizes; Round, Loop and Open Eye. **We are headquarters** and the most extensive manufacturers in Saddlery, Coach and General Hardware Specialties. Our 80 page catalogue now in the printers' hands.

Covert's Saddlery Works,

FARMER, N. Y., U. S. A.

Electric Toy Making, Dynamo Building and Electric-Motor Construction. By T. O'CONOR SLOANE, A.M., E.M., Ph.D. This work treats of the making at home of electrical toys, electrical apparatus, motors, dynamos, and instruments in general and is designed to bring within the reach of young and old the manufacture of genuine and useful electrical appliances. The work is specially designed for amateurs and young folks. Very fully illustrated. \$1.00

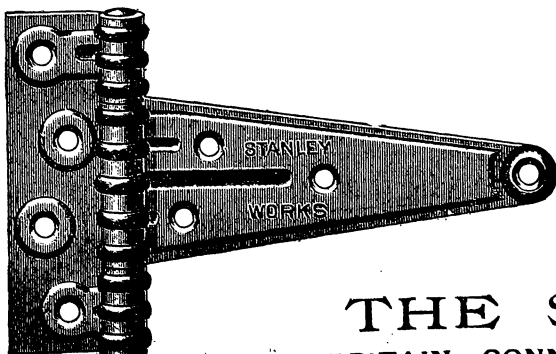
For sale by David Williams, 96-102 Reade St., N. Y.

His Third Season.

The same Columbia Bicycle.

Columbias grow old gracefully.

Columbia catalogue. 45 comprehensive engravings. The most exhaustive cycling catalogue published. Free at Columbia agencies. By mail for two two-cent stamps. Pope Mfg. Co., Boston, New York, Chicago, Hartford.



"Once tried
Always bought."

Stanley's Corrugated Steel Hinges.

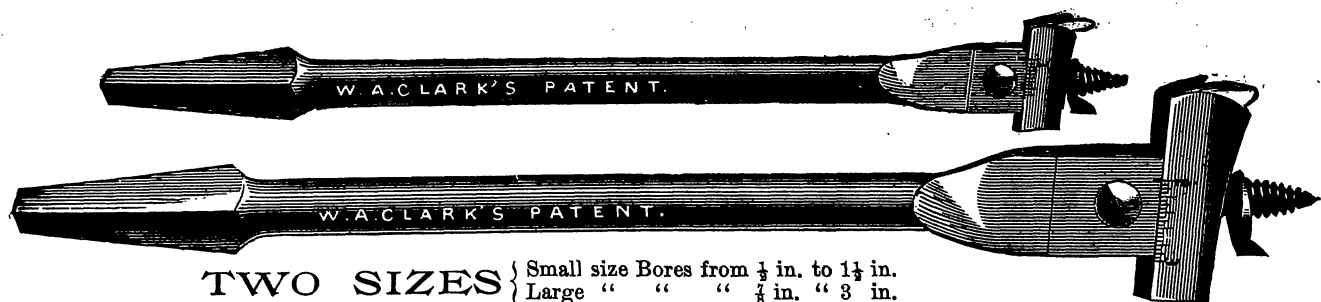
If your jobber does not handle them send us his name and address and get some valuable "Pointers" Free.

THE STANLEY WORKS,

NEW BRITAIN, CONN.

79 CHAMBERS ST., NEW YORK.

THE WM. A. CLARK PATENT EXPANSIVE BIT.



TWO SIZES { Small size Bores from $\frac{1}{2}$ in. to $1\frac{1}{2}$ in.
Large " " " $\frac{3}{4}$ in. " 3 in.

SPECIAL CUTTERS: No. 5—For Large Bit, Bores from 3 in. to 4 in. No. 6—For Large Bit, Bores from 4 in. to 5 in.

Stock and workmanship superior to all others. Every part interchangeable.

Quality guaranteed. For sale by all Hardware Dealers.

Manufactured by **R. H. BROWN & CO.,** New Haven Conn.

*You take no risk on the quality
We make only the best!*



**Sand
Papers**
IN
Reams and Rol

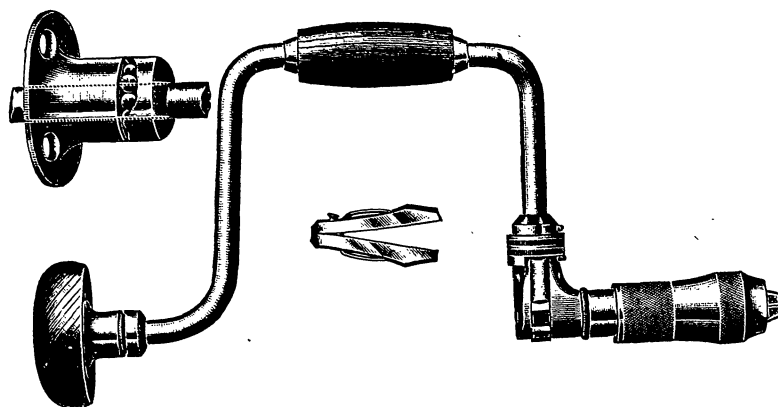
Filnt Paper
Garnet Paper
Emery Paper
Emery Cloth

HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

BAEDER, ADAMSON & CO.

730 MARKET STREET, PHILADELPHIA.
87 BECKMAN STREET, NEW YORK.
143 MILK STREET, BOSTON.
182 LAKE STREET, CHICAGO.

BARBER IMPROVED BRACE.



Instead of reducing the price of our braces to meet competition, we have from time to time increased the cost of making the goods. Our latest improvement is the use of Ball Bearings, as seen in the cut. These balls prevent all wear, and cause the head to turn without friction. It is probably the best improvement which has been put on braces for many years. This has been the leading brace in market for a long time and we intend to make it worthy of its reputation for a long time to come. All Hardware Dealers will furnish them.

MILLERS FALLS CO.,

93 READE STREET, - - - NEW YORK.



**STANDARD
Spiral Screw Drivers.**

Patented July 3, 1888.

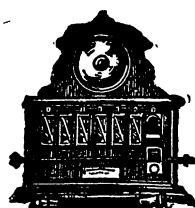
STRONGEST and QUICK-EST SCREW DRIVER in the market. One Tempered Steel Bit furnished with each Driver **FINELY POLISHED** and **HEAVILY NICKEL PLATED**. Lignum Vitæ Head. **LENGTH OVER ALL, 18 inches.** Each one in a separate wooden box with slide cover.

Chantrell Tool Company,
Reading, Pa.

JOHN H. GRAHAM & CO.,
General Agents,

113 Chambers St., New York

**COOK'S
PATENT
LEVEL.**



Made in Wood and Iron. Every Level Fully Guaranteed.

Inquire at your nearest hardware store for them. If not in stock, send to

TAKE NO
OTHER.

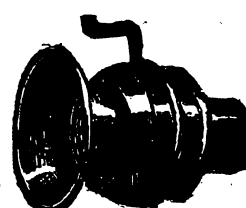
DAVIS & COOK,
WATERTOWN, N. Y.

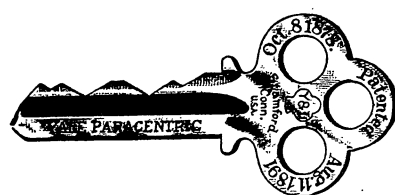
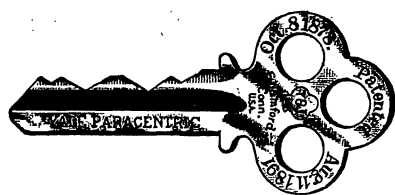
W. R. OSTRANDER & CO.,

204 FULTON STREET, NEW YORK,
Manufacturers of

**SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC
MECHANICAL AND PNEUMATIC ANNUNCIATORS
AND BELLS.**

Complete outfits of Speaking Tubes, Whistles
Electric, Mechanical and Pneumatic Bells. A full line
always in stock. Send for new catalogue. Factory,
DeKalb ave. near Knickerbocker Brooklyn, N. Y.





YALE PARACENTRIC



LOCKS.



THE YALE & TOWNE M'F'G CO.,

STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburgh. San Francisco.

THE DEALER who sells what
THE PEOPLE ask for
MAKES FRIENDS and MONEY, and
SAVES TIME and TROUBLE.

The people ask for

LePage's Liquid Glue,

And the people are right.

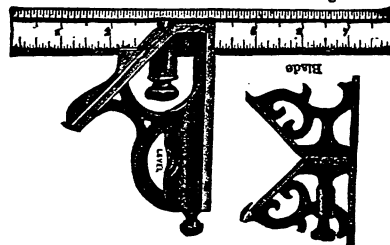
It is the strongest and best glue made. It has been imitated, but never equalled. Be sure to get what you order and ACCEPT NO SUBSTITUTES.

Our name is on every label

RUSSIA CEMENT CO.,
GLOUCESTER, MASS.

New York Office, 95 Reade and 113 Chambers Streets.
Pacific Coast Office, 23 Davis Street, San Francisco, Cal.

CHAPLIN TRY AND CENTRE SQUARE.



Also a full line of

MACHINISTS' FINE TOOLS.

If you haven't our 1893 catalog send us a postal card.

STANDARD TOOL CO.,
ATHOL, MASS., U. S. A.
ATHOL MACHINE CO., Selling Agents.

JESSE JONES & CO.,
HARDWARE
SHELF BOXES

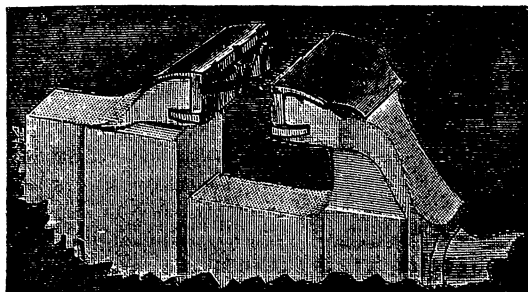
Made of Wood.
No screws or
nails used to work
out and cut
your shelving

615 & 617 Commerce St., Phila.
Send for circular and list of references.

IF YOU WANT THE BEST
BRITANNIA SPOONS
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL TO ANY OTHER
IF NOT SUPERIOR
TO ANY OTHER
HADDAM, CONN.
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
NICKEL SILVER SPOONS
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL TO ANY OTHER
IF NOT SUPERIOR
TO ANY OTHER
HADDAM, CONN.
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
SILVER PLATED SPOONS
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL TO ANY OTHER
IF NOT SUPERIOR
TO ANY OTHER
HADDAM, CONN.
HAVE BEEN IN BUSINESS SINCE 1840.



BINGHAM
PATENT VISE JAW CAL

Will Fit any Kind of Vise.

For protecting finished work. Will hold finished rods of any shape without injury.

3 1/4 inch, per pair, 40 cents.
4 " " " 50 "
4 1/4 " " " 60 "

PRENTISS VISE CO.
44 Barclay St., New York.

W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 209.

Fig. 381.

Fig. 145.

or wherever it is desired to raise a large quantity of water by
hand power.

The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

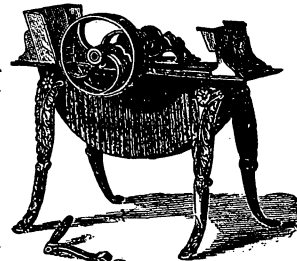
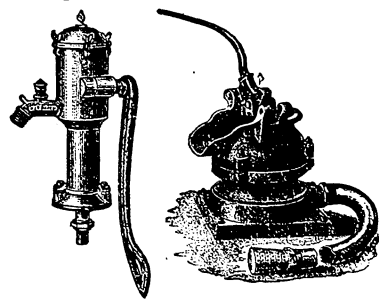
CAPACITY

from 3,000 to 4 500 gallons per hour.

These pumps are simple, durable and low priced.

Made either as shown in cut for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.



C. I. Grindstone Frame.

THE DEMING CO.
FACTORY SALEM O.S.A.
MANUFACTURERS OF
HAND & POWER PUMPS, WELL SUPPLIES & C. VERTICAL STEAM PUMPING ENGINES.
ARTESIAN WELL CYLINDERS, HYDRAULIC RAMS.
N.Y. OFFICE: 72 JOHN ST.
HENNON & HUBBELL
GEN'L. WESTERN AGTS: 55 & 57 N. CLINTON ST. CHICAGO, ILL.

THE H M MYERS COMPANY
ONE SOLID STEEL SHOVELS
AND STRAPS
THE BLADE
Are made from this one solid Piece of Steel.
A Perfect Plain Back Tool With thick Centre.
WITHOUT WELD OR RIVET
CAREFULLY TEMPERED
WRITE FOR LISTS BEAVER FALLS, PA. AND DISCOUNTS

F.E. MYERS & BRO.

ASHLAND, O.
+ CATALOGUES FREE +
Ashland Pump and Hay Tool Works.

The New York Safety Dumb Waiter,
"The Manhattan Dumb Waiter,"
"The Improved Humphrey Hand Elevator,"
Made specially to be sold by Hardware Stores. Thousands in use. Catalogues on application.
THE STORM MANUFACTURING CO.
NEWARK, NEW JERSEY.
Formerly of Poughkeepsie, New York.

SICKELS, SWEET & LYON,

Wholesale Hardware.

Office, 35 Barclay St. Warehouse, 40 Park Place, New York.

N. Y. AGENTS FOR

WINSLOW SKATES.

Eagle Files.

Union Steel Screw Co.'s Screws.

Orders for Skates should be placed early. Shipments from factory or New York as preferred.

Fall Catalogue No. 6 Issued September 1st.

SICKELS, PRESTON & NUTTING CO.,

Wholesale Hardware and Tinnery's Stock.

N. Y. Office as above.

DAVENPORT, IOWA.

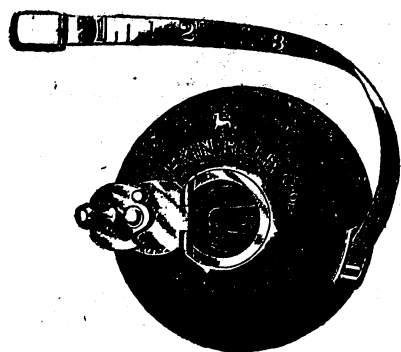
HORACE E. BRITTON, Stoughton, Mass., Manufacturer of the **HENRY'S PATENT COMBINATION HAFT,**



AND OTHER TOOL SPECIALTIES.

The Combination Haft contains six Brad-Awls, one Chisel, Screw Driver, Diamond Point Awl, Marking Awl, Tack Puller and Reamer. Send for Circular and Prices.

Full Set Sent Post-paid on receipt of \$1.00. (No stamps.)



"RELIABLE" Steel Measuring Tapes.

Entirely new. Handle or crank when closed is perfectly flush with leather case. Opens by pressing button on opposite side and folds out double, giving increased leverage. Best and most convenient steel tape on the market. Fully guaranteed. Will send samples on approval. We carry a complete stock of our goods at our New York Office, 20 Murray St.

LUFKIN RULE CO., Saginaw, Mich.

Lightning Band for Cases and Crates.

(COVERED BY U. S. LETTERS PATENT.)



Mounted on reels and always ready for use and convenient to handle. Easily and quickly binds shipping cases and crates in a neat, strong and substantial manner.

PRICES:

No. 1, per reel of 2000 ft., \$4.50 net.
No. 2, per reel of 2000 ft., \$4.75 net.
Pliers for cutting wire, 50 cents extra.
No. 1 for cases under 300 or 400 pounds, and No. 2 for all heavier cases.

Buffalo Specialty Mfg. Co.
Sole Manufacturers,
Buffalo N. Y. U. S. A.

Hand Screws

Hand Screw Spindles made of strictly second growth Hickory—never anything else.

Case and Glue Clamps

All threads cut with a saw to leave the grain solid—a patent process.

Cabinet Makers Benches

Nearly 700 of our Benches used by Grand Rapids Furniture makers alone.

WRITE FOR CATALOGUE.

Grand Rapids Hand Screw Co.

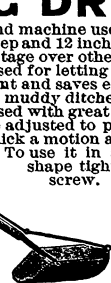
GRAND RAPIDS, MICH.

LIGHTNING DRAIN CLEANER.

The Drain Cleaner is a hand machine used as a shovel. The dirt pan is made of No. 18 Steel 3 inches deep and 12 inches long, with vertical end in rear. It has a decided advantage over other machines in dipping water and dirt. It is also used for letting down tiling in ditches, which is very convenient and saves extra labor of standing and working in muddy ditches. The iron adjusting rod can be used with great rapidity and ease and can be adjusted to pull or push with as quick a motion as may be desired. To use it in any particular shape tighten the set screw.

For Prices and Discounts, address

BUCKEYE MFG. CO.,



Union City, Ind.

THE ART OF SELLING.

By F. B. GODDARD.

12mo. Flexible Cloth, 50 Cents.

In this book the author lets the reader into the secrets of the accomplished and successful salesman, illustrates his tact and finesse, and tells how he masters men: but beyond this, the work embraces much information which will be instructive and useful to all classes of business men. Besides suggestions to buyers, it contains chapters on "Changes in Business Conditions and Methods," "Salesmen's Compensation," "Retail Merchants and Salesmen," "Saleswomen," "How to Read Character," with a collection of clearly and tersely put important Legal Principles and Decisions Governing Sales. Sent, post-paid, upon receipt of price, by

DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.

IRON INSTEAD OF WOOD. GALVANIZED IRON TUBING and CURB,

—FOR—
CHAIN PUMPS,
(Kegler's Patent)

Are Giving Universal Satisfaction,

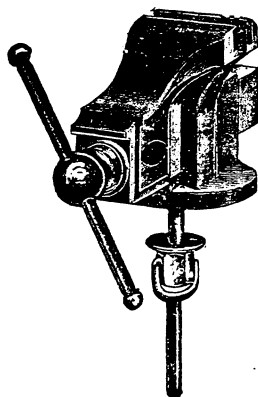
BECAUSE:



They do not rust and accumulate filth—always clean. Extreme lightness is combined with strength and durability. No freezing. No waste of water by reason of enlarged reservoir at top of tubing. No annoying wheel at bottom. Easy to handle. Tubing weighs less than 1/2 lb. per ft., is connected by couplings and can be attached to any make of curb.

Send for Catalogue.

Bellevue Pump Co., Bellevue, Iowa



HOLLANDS' OFFSET JAW VISE.

Specially adapted for drill press work where chucks cannot be used and equally good for special or regular bench work.

**Holland's Mfg. Co.,
ERIE, PA.,
Manufacturers, all
styles, VISES.**

NEW ADJUSTABLE BENCH LEVEL.

WITH GROUND AND GRADUATED VIAL.

4-6 and 8 inch.

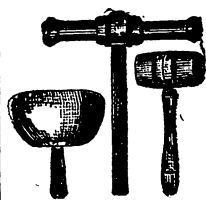


Three Sizes.

MANUFACTURED BY

C. F. RICHARDSON & SON,

ATHOL, MASS.



**N. Y. MALLET AND HANDI
WORKS.**

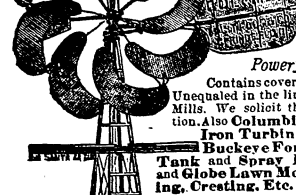
MANUFACTURERS OF

MALLETS.

Also Cotton and Bale
Hooks.

Patented Feb. 13, 1877, a new
combination of Hooks.
456 E. HOUSTON ST.,
New York City.

COLUMBIA STEELWIND MILL



New in Principle.
Beautiful in
Appearance.

Powerful in Operation.

Contains covered Internal Gear. Unequaled in the line of Pumping Wind Mills. We solicit the closest investigation. Also Columbia Steel Devices, Iron Turbine Wind Engines, Buckeye Force & Lift Pumps, Tank and Spray Pumps, Buckeye and Globe Lawn Mowers, Iron Fencing, Cresting, Etc. Write for circulars.

MAST, FOOS & CO., SPRINGFIELD, O.

GEO. N. CLEMSON, Pres.

LOUIS DUHME, Vice-Pres.

ROBERT J. JOHNSON, Treas.

F. B. EARLE, Sec.

The National Saw Co.,

OPERATING

Wheeler, Madden & Clemson Mfg. Co., Middletown, N. Y. Woodrough & McParlin, Cincinnati, O. Woodrough & Clemson, Boston, Mass. Monhagen Steel Works, Middletown, N. Y. Richardson Brothers, Newark, N. J. Harvey W. Peace Co., Brooklyn, N. Y. Pennsylvania Saw Co., Philadelphia, Pa.

GENERAL OFFICE

96 & 98 READE ST.,

NEW YORK.

SAWS

Three Essentials

IN THE MODERN
CROSS-CUT SAW.

- 1.—Teeth of uniform thickness.
- 2.—Five Gauges taper in middle of blade.
- 3.—Three Gauges heavier on ends than in center of back.

For 10 YEARS the Simonds Crescent-ground Cross-cut Saw (the only Saw on the market possessing these **ESSENTIALS**) has stood out prominently in contrast with all other makes of cross-cut saws. It has been the **CRESCENT-GROUND** against the **FIELD--MODERN IDEAS** against **ANCIENT METHODS**.

TO-DAY the Crescent-ground Saw is in use in every important lumber camp in the United States. Manufacturers have endeavored to imitate it, but the Machinery producing the Saw, the Process by which it is produced, and **THE SAW**, are patented. All imitations are but involuntary acknowledgments of the **SUPERIORITY** of

THE CRESCENT-GROUND CROSS-CUT SAW.

(PATENTED DEC. 26, 1882.)

SIMONDS MFG. CO.,

SIMONDS SAW CO.,

FITCHBURG, MASS.

CHICAGO, ILL.

SAN FRANCISCO, CAL.

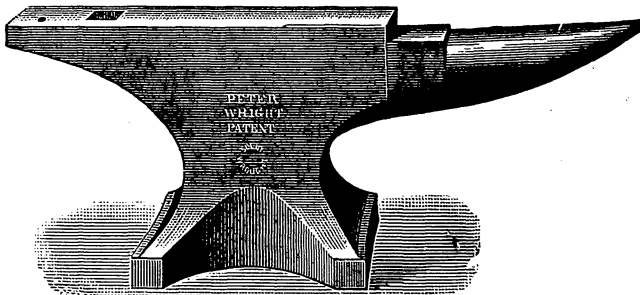
PORTLAND, ORE.

Peter Wright's Patent Solid Wrought Anvil

PETER
WRIGHT
PATENT

SOLID
WROUGHT

Fac-Simile of Trade-Mark.



Fac-Simile of Green Label.

By Royal Letters Patent,

V. R.

PETER WRIGHT'S

SOLID WROUGHT

ANVIL

Made of Best Scrap Iron!
THE BICK FACE AND END ALL
IN ONE SOLID PIECE!

You are cautioned in buying to see that each anvil is stamped with the full trade-mark on one side and has the green label affixed to the other.

EXHIBIT STAND No. 167,
GROUP 71.

WORLD'S FAIR.

BRITISH SECTION,
MACHINERY BUILDING.

PETER WRIGHT & SONS, DUDLEY, ENGLAND.

CIRCULAR,
BUTCHER,

BAND,
BUCK

SAWS

MANUFACTURED BY

C. A. HILES & CO.,

336-338 Carroll Ave., CHICAGO.

COMMON MOUSE TRAPS
BEST FOR USE!

Ripley Mfg. Co., Unionville, Conn.



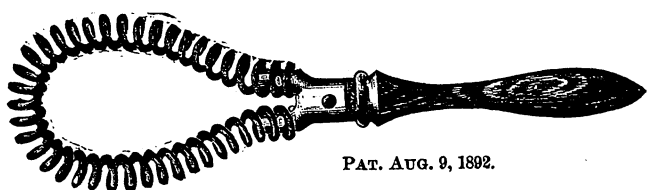
Porcelain-Lined Lemon Squeezers, Steak Hammers, Boot Jacks, Magnetic Tack Hammers, Mallets, Bung-Starts, Hand Screws, Beacon Hill Pat. Mouse Traps, Sunny-Side 2 lb. Lap Board

3

NICKLE, Silver and Bronze Metallic Figures and Letters, Sizes 1/4 in to 3 in. Pattern Letters, Steel Stamps, Brands, Dies &c. Send for Reduced Price List. We make a specialty of the Hardware Trade.

A. A. WHITE & CO., Providence, R.I.

THE BOSS DUST BEATER.



PAT. AUG. 9, 1892.

NEAT, DURABLE, AND DOES THE BUSINESS.

For removing dust and filth from Clothing, Upholstered Furniture, Rugs and Carpets it is just the thing. Will raise the nap and so improve the appearance. Will not, like other Dust Beaters, leave marks, nor tear the fabric. The coil is of steel wire secured in a malleable iron socket and attached to an enameled wooden handle. Just what everybody wants.

Retail Price, 25 Cents. Sent by Mail, 35 Cents.

PEABODY & PARKS,

Manufacturers,

TROY, N. Y.

THE CLARK MFG. CO.,

Blind Hinges, Gate Hinges, Door Butts,

And other **HARDWARE SPECIALTIES**

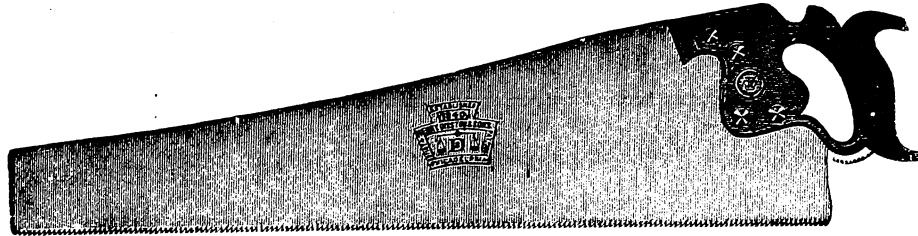
BUFFALO, N. Y.

"If you want a Saw it is best to get one with a name on it which has a reputation.
A man who has made a reputation for his goods knows its value as well as its cost and will maintain it."—HENRY DISSTON

THE SAWS THAT LEAD THEM ALL

DISSTON & SONS' PATENT D-8 HAND SAW.

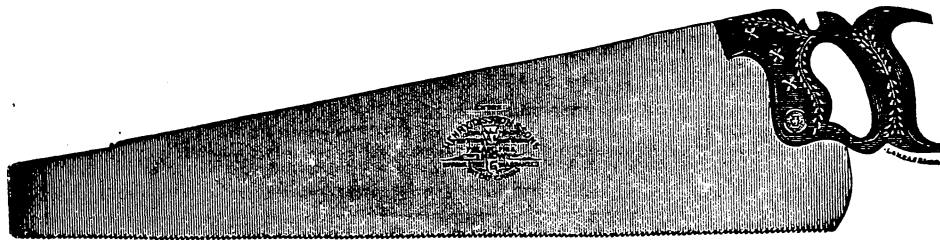
"THE
SAW;"
HOW
TO
CHOOSE
IT,
AND
HOW
TO
KEEP
IN
ORDER,
Sent
Free
on
Receipt
of
Name
and
Post Office
Address.



This Saw combines all the valuable improvements in Hand Saws that have been made by us of late. The first and most important is the hollow or skew back, the success of which can best be attested by the number sold. The peculiar shape of the butt or heel, coupled with the new method of fastening to the handle, give a full stroke of the blade without fear of catching or hooking in the work; and as the handle is put further on the blade you have a full stop on the proper point and a greater command over your Saw, by reason of being two inches nearer the point, which must give more power.

The Saw being let into the handle on a circle, has a perfect bearing, which, with the new screws, makes it stronger and almost impossible to work loose, and avoids the unsightly gap that is seen on the back of the old style handle. All the above features are patented.

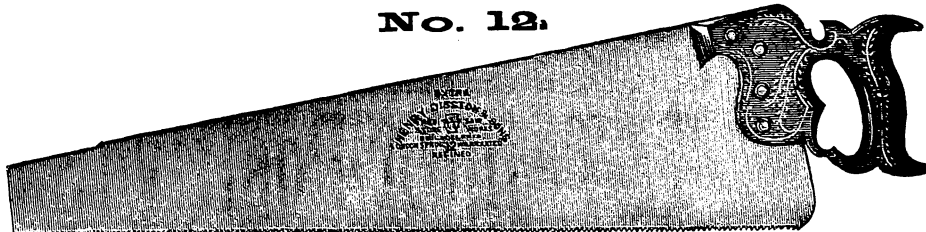
Our New No. 16 Premium Saw.



AN EXTRA FINE SAW IN EVERY RESPECT.

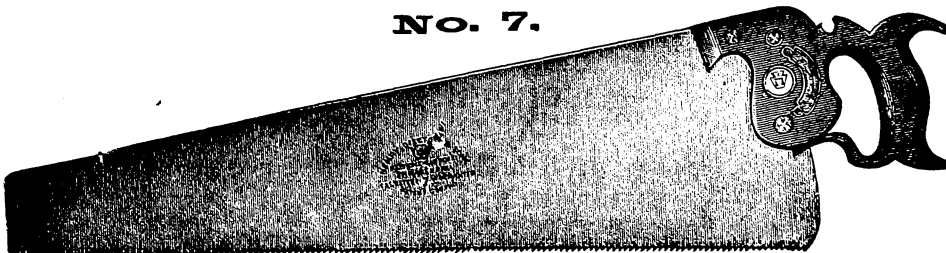
Having the Latest Close up Handle, Spring Steel Blade, Extra Thin Back, Finely Grained, with an Apple Handle and Four Brass Centennial Screws.

NO. 12.



DISSTON & SONS' Extra Refined London Spring Steel, Selected and highly Polished Blade, Handle Carved and Polished, 4 Improved Brass Screws, the finest Hand Saw manufactured.

NO. 7.



DISSTON & SONS' Cast-Steel, Warranted, Beech Handle, Polished Edge, 4 Improved Screws, Grained Blade.

"POCKET
EDITION
OF
THE
SAWYER"
and
"LUMBER-
MAN'S
HAND
BOOK,"
Sent
Free
on
Receipt
of
Name
and
Post Office
Address

ASK YOUR DEALER TO ORDER THEM FOR YOU.

HENRY DISSTON & SONS

(INCORPORATED),

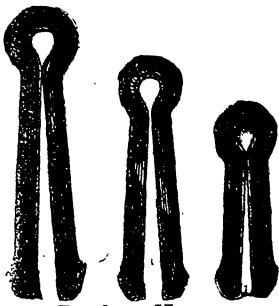
Keystone Saw, Tool, Steel and File Works, Philadelphia, Pa.

FACTORIES AT
AKRON, - OHIO.
CANTON, - OHIO.

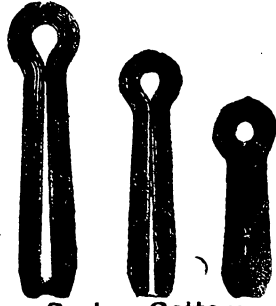
The Whitman & Barnes Mfg. Co.

FACTORIES AT
SYRACUSE, - N. Y.
ST. CATHARINES, ONT.

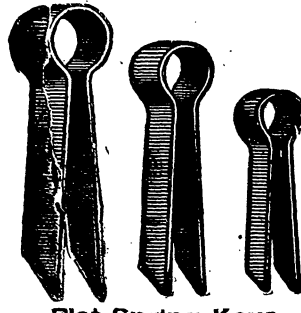
—MANUFACTURERS OF—



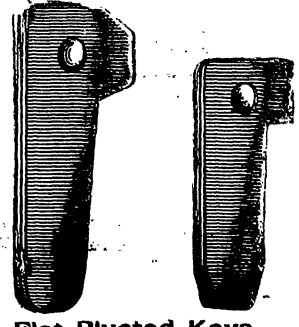
Spring Keys.



Spring Cutters.



Flat Spring Keys.

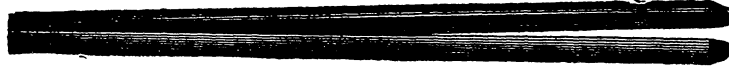


Flat Riveted Keys.

BRANCHES AT

79, 85 W. Monroe Street,
CHICAGO ILL.
1324 West 11th Street,
KANSAS CITY, MO.
126 Main Street,
CINCINNATI OHIO.

Cellar Box Cutters.



NEW YORK OFFICE, 102 CHAMBERS ST.

BRANCHES AT

32 So. Market Street,
BOSTON, MASS.
1917 Market Street,
PHILADELPHIA, PA.
33 Market Street,
SAN FRANCISCO, CAL.

NICHOLSON FILE CO.
 PROVIDENCE, R. I.
 VARIETIES FILES
 3000
 (X.F.) AND INCREMENT CUT FILES

THE LARGEST AND MOST COM-
 PLETE FILE WORKS IN
 THE WORLD.

Philadelphia, 1876.




MCCAFFREY FILE CO.,

FIFTH and BERKS STS.,
PHILADELPHIA, PA.

For Superiority



Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.
Superiority acknowledged wherever used, sold or exhibited.

BEST	"TROJAN" HORSE RASPS.	LOWEST
CRUCIBLE		IN
STEEL.		PRICE.
STRONGEST	BANKER & WHITE,	LET
TOOTH.	(Troy File Works.)	US
		QUOTE

The Taintor Positive Saw Set.

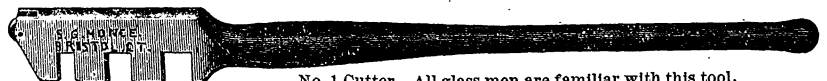
Mechanics are now inquiring for this tool, and Hardware Dealers should have them in stock, or at least have a sample.

For Prices and Discounts, address

WIEBUSCH & HILGER, LTD., SOLE AGENTS,
84 and 86 Chambers Street, NEW YORK.



MONCE'S NOVELTY GLASS CUTTERS. — INTERCHANGEABLE LOCK STENCILS.

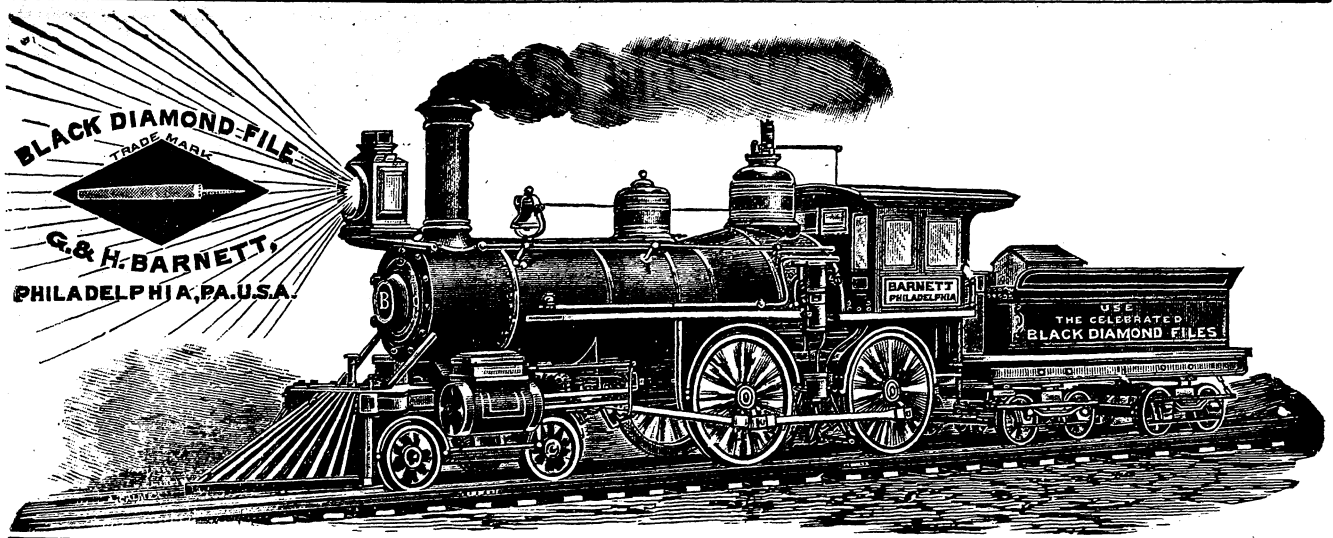


No. 1 Cutter. All glass men are familiar with this tool.
S. G. MONCE, - - BRISTOL, CONN.



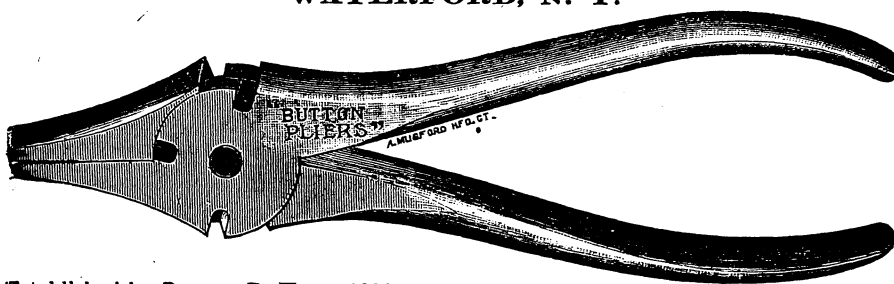
WM. KROGSrud,
 Engraver and Die Sinker,
 61 Fulton St., N. Y.
 Manufacturer of
STEEL STAMPS
 For Every Purpose.
 Steel Letters and Figures.
 Burning Brands, Stencils
 &c. Send for Illustrated
 Catalogue.





J. M. KING & CO.,
WATERFORD, N. Y.

Manufacturers of
BUTTON'S



**Pat. Wire Cutter
AND PLIER COMBINED.**

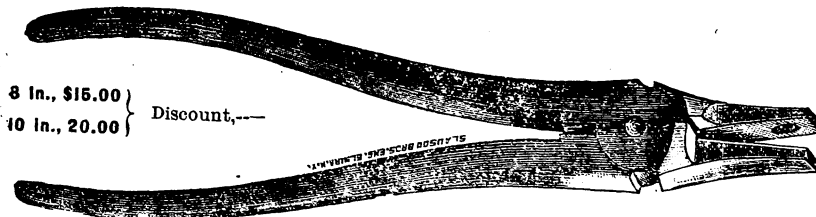
Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and
MACHINISTS' STOCKS and DIES, PLUG and
TAPER TAPS, HAND, NUT and SCREW
TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

Established by DANIEL B. KING, 1829.

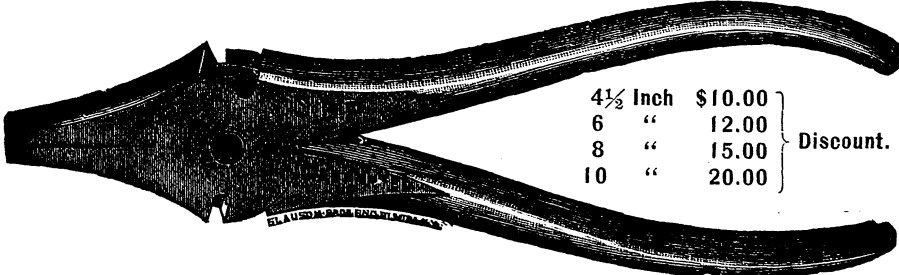
Cronk's Patent Wire Cutter AND Bender.



8 In., \$15.00 }
10 In., 20.00 } Discount,---

This surpasses any Plier in the market for Cutting and Bending Wire, and can also be used in place of Hill's Hog Ringer. Is especially adapted to farmers' use in building Wire Fence, &c. Our reasons for claiming that we have the best Pliers in the market are:
FIRST.—We use the best Tool Steel and they are nicely finished.
SECOND.—We combine both Flat and Round-Nosed Pliers in one; the concave and convex circles between the handles are used for bending wire in any desired shape.
THIRD.—The cupping in the Nose is used for pulling tacks, brads or nails, and can also be used in place of Hill's Hog Ringer.
FOURTH.—We can cut Barbed Wire, Barb Belt or any kind of Wire used for Fencing purposes. We also claim that we have the only Plier made that the Cutting Jaws cannot be broken. By passing the Wire through the Pliers it makes a very handy cut and also holds the Wire after it is cut.

C. B. P.



4½ Inch \$10.00 }
6 " 12.00 } Discount.
8 " 15.00 }
10 " 20.00 }


What we claim for this plier is that it is made from best quality tool steel and is made heavier and stronger than any plier of its kind in the market and the finish is first-class. Also they are made so the jaws are parallel when used on wire from 9 to 14 gauge and will hold the wire solid.

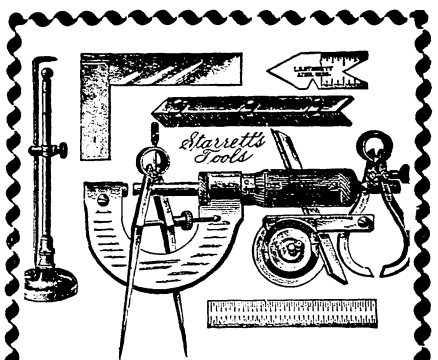
CRONK HANGER CO., Sole Manufacturers, Elmira, N. Y.
Pacific Coast Agents: CHAS. L. PIERCE & CO., San Francisco, Cal.

THE GENDRON IRON WHEEL CO., - Toledo, Ohio,

WANTS

Manufacturers' Agents and Salesmen on Commission to sell
Juvenile Bicycles, Velocipedes, Tricycles, Iron Wagons,
Goat Sulkies, Toy Barrows, Doll Cabs.

Dealers in Hardware Specialties will do well in handling
the  Cycle Wrench. Address above for terms and full particulars.



**Skilled
Mechanics**

want tools that are warranted
accurate, best in workmanship,
latest in design, finest in finish.

**Live
Dealers**

want tools they can swear by,
not at. That can be relied upon
to satisfy intelligent customers.
That come nicely put up. That
pay a good profit.

**Starrett's
Tools**

meet the requirements of both.
SEND FOR CATALOGUE.

L. S. STARRETT

Athol, Mass., U. S. A.

LONDON AGTS: Chas. Churchill & Co., Ltd.,
21 Cross St., Finsbury, E. C.

TRADE MARK



John Wilson's Butchers' Knives and Steels, Skinning, Sticking, Farriers' & Shoe Knives,

Have established and maintained their reputation, for superiority,
against all Competitors, from

THE YEAR SEVENTEEN HUNDRED & FIFTY,
and are still in increasing demand. As in the past, it is the unalterable
DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF THE HIGHEST POSSIBLE QUALITY.

WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND.

SOLE AGENTS FOR THE UNITED STATES, AND THE CANADAS.
Messrs. Hermann Boker & Co., 101 and 103 Duane St., New York.

CORPORATE MARK



JOSEPH RODGERS & SONS, Limited.

—MANUFACTURERS OF—

Pocket and Table Cutlery, Scissors, Razors, Erasers, &c., &c.

These goods have fully maintained their reputation as the best cutlery in the world for over

ONE HUNDRED AND FIFTY YEARS.

Any Infringements of our Name and Corporate Mark will be promptly prosecuted.

Sole Agents for the United States,

ALFRED FIELD & CO., 93 Chambers and 75 Reade Street, New York.

Established 1836.

ALFRED FIELD & CO.,

93 Chambers and 75 Reade Streets,

NEW YORK.

IMPORTERS OF

**HARDWARE, CUTLERY, GUNS ANVILS,
CHAINS, FILES.**

SOLE AGENTS FOR

Joseph Rodgers & Sons, Best Cutlery in the world; W. K. & C. Peace, unrivaled Grass Hooks Straw Knives and Scythes; Joseph Elliot & Sons, Celebrated Razors; Peugeot Frères, "French Toilet" and other Clippers; L. Hugoniot Tissot, Fine Steel Pliers, &c.; Eley Bros., Caps, Wads Cartridge Cases, &c.; Webster & Horsfall, Steel Wire of every description.

Send for Rodgers' New Illustrated Catalogue

We manufacture all kinds of

EDGE TOOLS

of highest grade and sell at proper prices.

Send for Illustrated Price-List.

BUFFALO EDGE TOOL WORKS, Ridgway,
Pa.
BUFFALO OFFICE, 42 Lewis Block.

— REMEMBER —

WE MAKE ONLY

The Very Highest Grade

MECHANICS' TOOLS.

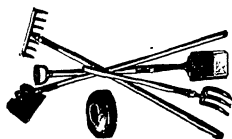
H. H. MAYHEW CO., Shelburne Falls, Mass

THE KNAPP & COWLES MFG. CO.,
BRIDGEPORT, CONN.

Makers of a large line of
STANDARD

Hardware Specialties.

SEND FOR
K Catalogue.



THE FOX SAFETY RAZOR.

(U. S. Patent 484,116, October 11th, 1892.)

Is the finest and most practical in the world.

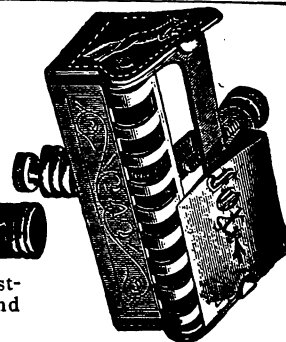
EVERY MAN HIS OWN BARBER.



Makes shaving a luxury; no danger of cutting. Adjustable blade. Silver plated frames. Sole manufacturer and patentee,

E. LOTHAR SCHMITZ, 92 Reade St., New York.

Sold by all the Leading Hardware and Outlery Houses.



Underhill, Clinch & Co.,

94 Chambers St., New York.

O. Ames & Sons, Shovels, Spades and Scoops,
Chadborn & Coldwell Mfg. Co.'s Lawn Mowers.

Utica Tool Co.'s Hoes and Rakes.

Sheble & Klemm's Manure and Hay Forks.

David Wadsworth's Scythes.

English Riveted Scythes and Grass Hooks.

Malleable Iron Rakes,

Wooden Rakes,

Scythe Snaths, Scythe Stones,

Poultry Netting, Green Wire Cloth,

&c., &c., &c.

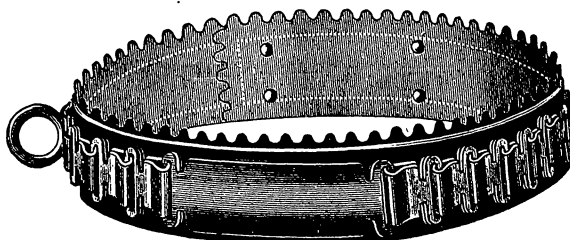
KELLEY'S PATENT DOG COLLARS,

HALTER
CHAINS,

Dog Leads

AND

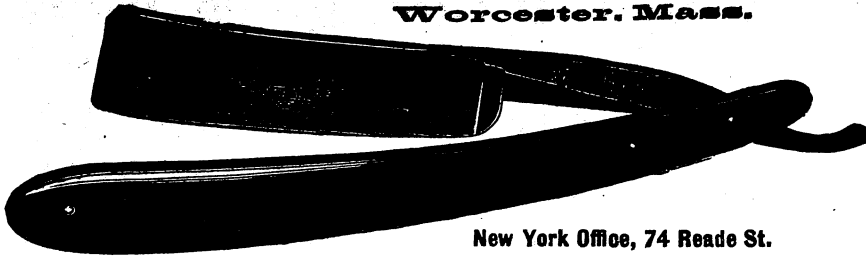
Key Chains.



KELLEY & WOOLWORTH, Niagara Falls, N. Y.

J. R. TORREY RAZOR CO.,

Worcester, Mass.



New York Office, 74 Reade St.

Our Razors have become the standard for excellence and are no higher in price than the foreign. We manufacture and carry in stock more than 200 styles. Send for illustrated catalogue.

THE STANDARD. BUCK BROTHERS,

MILLBURY, MASS.

The Most Complete Assortment in the U. S. of
Shank, Socket Firmer and Socket Framing
Chisels.



TRADE MARK

CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark also, "Riverlin Works."

Established 1825.

Incorporated 1892.

R. HEINISCH'S SONS CO.,

NEWARK, N. J., U. S. A.

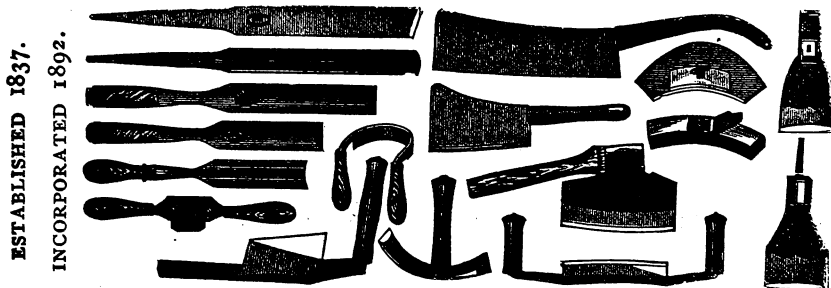
New York office, No. 90 Chambers St.

Tailors' Shears, Trimmers, Scissors, Tinnors' Snips, etc.

CATALOGUES AND PRICES ON APPLICATION.

**WE HAVE NO CONTRACT WITH
MESSRS. HERMANN BOKER & CO. AS
AGENTS FOR THE SALE OF OUR GOODS.**

HIGHEST AWARD PARIS EXPOSITION, 1889.



THE L. & I. J. WHITE CO.

BUFFALO, N. Y.

MANUFACTURERS OF

Coopers', Carpenters' and Ship Tools, Plane Irons,
Cleavers, &c. Full Line Chisels.



FOR THE CORRECT MODE IN SHAVING
USE CURLEY'S PATENT
SAFETY

GUARD

RAZOR

THIS improvement permits CORRECT SHAVING, therefore no irritation is caused, and the most inexperienced can shave with perfect safety.

We also carry the largest line in the United States of CUTLERY of every description.

J. CURLEY & BROTHER,

6 WARREN STREET, - - NEW YORK.

Cast Shears.

ACME SHEAR CO.,

BRIDGEPORT, - CONN.

MARTEN DOSCHER,

Commission Hardware,

88 Chambers St., New York.

Agent—G. W. Bradley's Edge Tools, Axes, Coopers' Tools, Cleavers, Bush Hooks, Draw Knives, Ship-Carpenters' Tools, &c. Also a full stock of Planes, Brooks' Bright Wire Goods, Washita Stone, and Taunton Tack Co.'s Rivets, &c.

ALASKA.

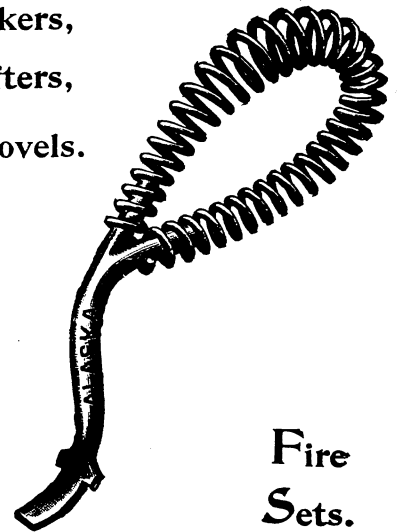
ALWAYS COLD.

Stove Trimmings.

Pokers,

Lifters,

Shovels.



Fire
Sets.

For Sale by All

First-class Jobbers in Hardware.

Made under Gaitly Patents and only by

Troy Nickel Works,

TROY, N. Y.

FRANCIS FROST & CO., Toronto, Ont.
Canadian Sales Agents.

WHEN IN WANT OF
WOSTENHOLM'S
I★XL



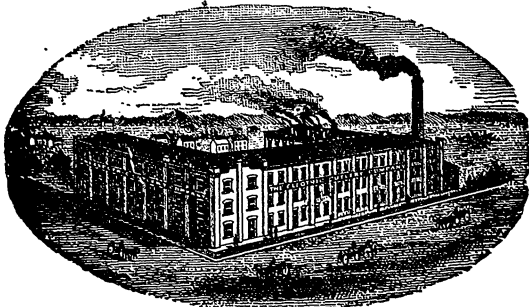
Knives or Razors,

SEND TO

FRED. B. GURNEY.

16 Chambers St., N. Y.

The Best Equipped Cutlery Works in the World.



FACTORY: FOURTH & DICKERSON STS. NEWARK, N. J.

THE ELECTRIC CUTLERY CO.,

113 Chambers St., N. Y., and Newark, N. J.

Manufacturers of Razors, Knives
Razor Strops, Scissors and Shears.

(SEND FOR CATALOGUES.)

NORTHAMPTON CUTLERY COMPANY, NORTHAMPTON, MASS.

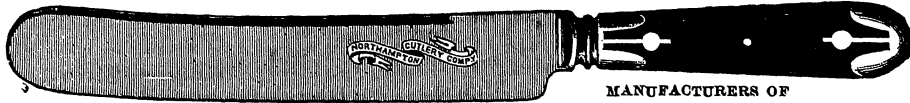
NEW YORK
SALESROOM,122 Chambers
Street.

TABLE CUTLERY, BUTCHERS' CARVERS, PLATED GOODS, &c.

Send for Revised Catalogue.

W. & S. BUTCHER, Sheffield, England, and 135 Duane St., New York
Makers for over *One Hundred Years* of the celebrated "*W. Butcher*" Files and
Edge Tools and "*Wade & Butcher*" Razors, and the Original Manufacturers of Hollow
Ground Razors, can with confidence highly recommend their goods and particularly their



Brand as being the most perfect *Extra Hollow Ground*
Razors ever manufactured and especially suited for the use of
Barbers and for private use. Genuine Razors are marked with
one of the following Corporate Trade-Marks:

WADE & BUTCHER
SHEFFIELD, ENGLAND

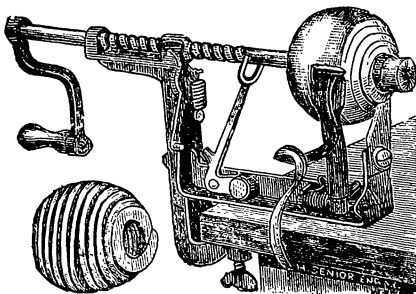
OR



OR



FOR SALE BY ALL DEALERS IN HARDWARE, CUTLERY AND FANCY GOODS.



WE HAVE had nearly thirty years' experience in manu-
facturing Apple Parers.

For family use, evaporators, bakers, hotels, restaurants,
etc., etc., we make Apple Parers to pare; pare and core; pare,
core and slice, for hand or power use; with capacity as high as
100 bushels per day.

We are the oldest and largest manufacturers of Apple Parers in the world, and we make a
larger variety than has ever been made by any other firm. We think we know how to construct
Apple Parers, so as to produce the most satisfactory and economical results.

If you want Apple Parers, we want your order. and solicit correspondence.

GOODELL COMPANY, ANTRIM, N. H.

Ladd's Discount Book.

Price, \$3.00; Double Indexed Edition, \$4.00. Sent postpaid upon receipt of price, by

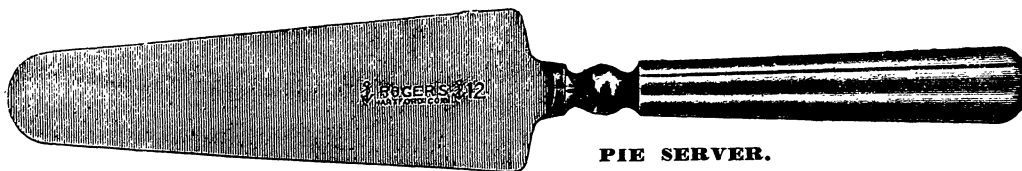
DAVID WILLIAMS, Bookseller and Publisher, - - - - - 96-102 Reade Street, New York.

—NONE BETTER—

THAN THE



SILVER PLATED WARE.



PIE SERVER.

MANUFACTURED BY

THE WM. ROGERS MFG CO.,

Office and Factory, HARTFORD, CONN. P. O. Drawer 30.

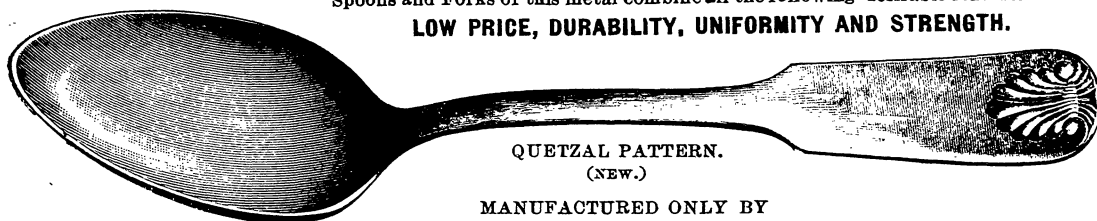
NEW CATALOGUE FOR THE ASKING.

AZTEC COIN METAL

MADE INTO SPOONS AND FORKS.

Spoons and Forks of this metal combine all the following desirable features:

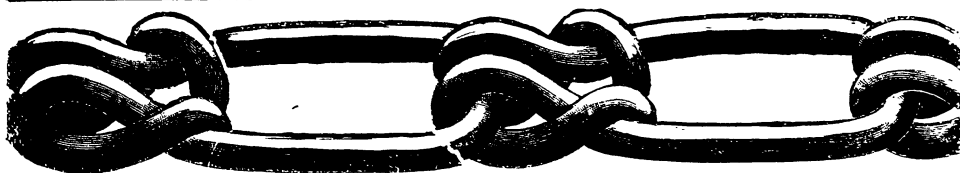
LOW PRICE, DURABILITY, UNIFORMITY AND STRENGTH.

QUETZAL PATTERN.
(NEW.)

MANUFACTURED ONLY BY

THE HOLMES & EDWARDS SILVER CO.,

Bridgeport, Conn.



outs, Kennel Chains, &c.; also cut to lengths for manufacturers' use.

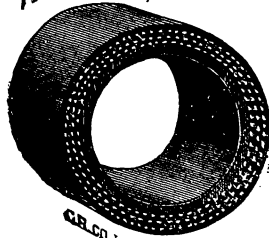
The cut represents the exact size of 6/0.

Thirteen Sizes made, 6/0 being the Largest.

The Bridgeport Chain Co.'s Triumph

Chain, made into Halters
Traces, Cow Ties, Tie-FACTORY AT
BRIDGEPORT, CONN.

NEW SEAMLESS TUBE



Who Has Not Had Bad Hose?

Who has not lost time, patience, money, by attempting settlement for such goods?

THE CAUSE in nine cases out of ten is the lapped seam.

THE REMEDY is in buying our

PATENT SEAMLESS-TUBE HOSE,

made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.

Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers' Cotton Hose, &c.

Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

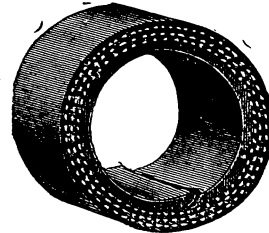
CLEVELAND RUBBER WORKS

of the Mechanical Rubber Co.,

CLEVELAND, O.,

Makers of Mechanical Rubber Goods, Clothing, Druggist's Sundries, Specialties, Etc.

OLD LAPPED TUBE.

SALES OF
Over Two Million Feet

GARDEN HOSE

alone during the past year, distributed throughout the United States, and not a single piece complained of, justifies us in guaranteeing that it will give absolute satisfaction.

We were awarded an order of
25,000ft. for World's Fair
of our Celebrated
Seamless-Tube
COTTON RUBBER-LINED HOSE.We Want Your Trade.
Send for 60-page Catalogue.
Write for Prices and Samples.

FAYETTE R. PLUMB,

Edge Tools,
Hammers

AND

Sledges.

Penna. R. R., Tucker and James Sts.

Manufacturer of



Main Office and Works

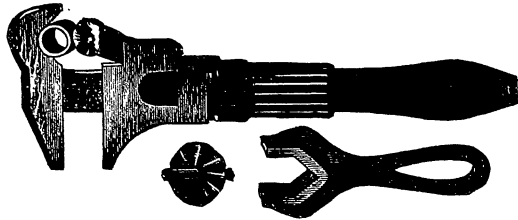
Railroad,
Miners'

AND

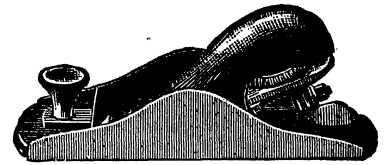
B. S. Tools.

Philadelphia Pa., U. S. A.

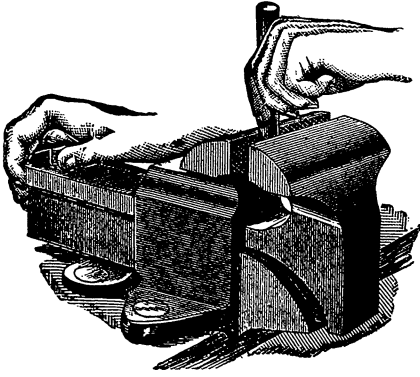
HIGH QUALITY TOOLS



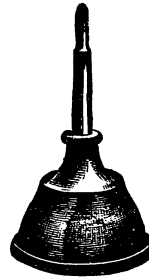
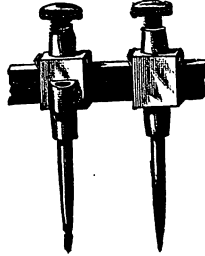
Donohue's Pat. Engineers' Wrenches,
Short or Long Sleeve Nuts, and
with Pipe Cutter.



Chaplin's Patent Iron Planes,
Corrugated Bottoms,
Checkered Rubber
Handles.



Stephens' Patent Vises, Quick Adjust-
ing Cam and Toggle-Joint, Sta-
tionary or Swivel Base.



Challenge Iron Planes.
Simplicity of Construction.

Boardman's Pat. Wrenches, Excelsior Expansion Bits, Whitney Drills, Baxter's Wrenches,
Wood's Pat. Plumb and Levels, Devoe's Square Attachments, Gem Wrenches,
Malleable Oilers and Lamps, Pencil Attachments.

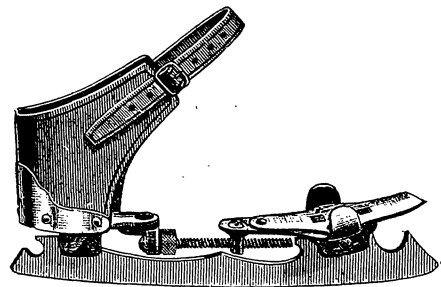
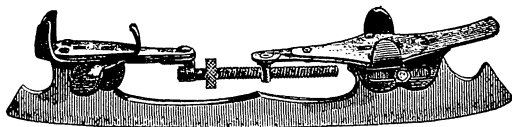
TOWER & LYON, Manufacturers, - - 95 Chambers St., New York.

ICE SKATES

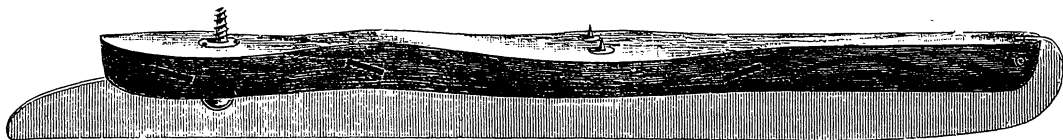
—MANUFACTURED BY—

THE UNION HARDWARE CO.,

Torrington, Conn.



DONOGHUE RACING SKATE.



SUPERIOR QUALITY, STYLE AND FINISH.

—NEW YORK OFFICE:—

TOWER & LYON. - - - - 95 Chambers Street.

No. 2 GLOBE INCANDESCENT

A PHENOMENAL 320 CANDLE-POWER COAL OIL LAMP.

THE GREAT STORE, OFFICE AND FACTORY LIGHT.

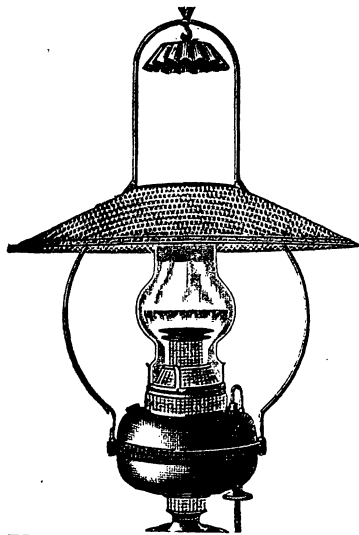
Brilliantly Illuminates a room 35 feet square at the cost of about one penny per hour.

Save your gas bills. Sold at no higher price than inferior lamps. Made also in handsome designs, with library extensions, for dining rooms, halls, libraries, &c. Sold everywhere. If your dealer does not keep it, write

THE STANDARD LIGHTING CO.,

100 to 118 Perkins Ave.,

Cleveland, Ohio.



Warranted Better than the Best

ESTABLISHED 1843.

MORE THAN 200 DIFFERENT PATTERNS.

None Genuine without our Trade-Mark.

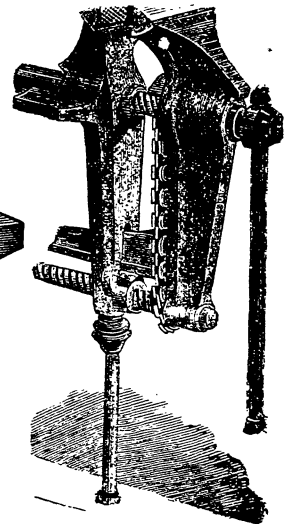
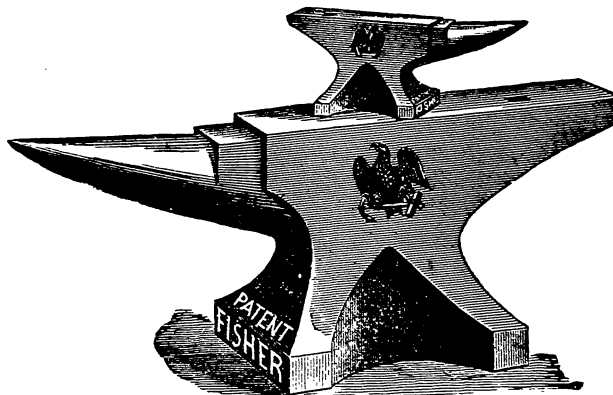
EAGLE and "FISHER" Stamp.

ENGLISH ANVIL

Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above.

FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.



EAGLE ANVIL WORKS,

Trenton, N. J.

Sold in New York by our agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfg. Co., 45 Chambers St.

WARREN AXE AND TOOL WORKS, WARREN, PA., U. S. A.,

Manufacturers of a Superior Quality of

AXES AND TOOLS,

Including Double and Single Bit Axes, Broad Axes, Hand Axes, Planing Mill Knives, Moulding Knives, Machine Knives of all kinds, Carpenter Adze, Mining Picks and Bark Spuds.

We make **THE SAGER SPECIAL CHEMICAL PROCESS AXE**, only known by us, while others are imitating this axe. None genuine without our label: **SAGER'S SPECIAL CHEMICAL PROCESS AXE.** Write for Prices.

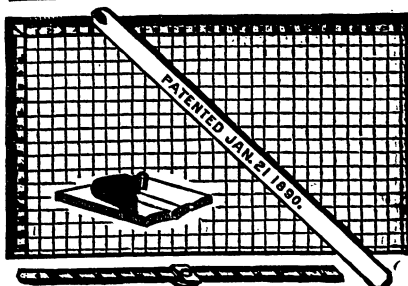


THE TRADE acknowledges our make of **BUTCHERS' STEELS**

THE BEST IN THE WORLD.

FOR CATALOGUES AND PRICE-LISTS ADDRESS

C. & A. HOFFMAN, Manufacturers, FRANKFORD, PHILA., PA.



The Canton Glass Board.

Cuts any Fraction of an inch by Eighths.

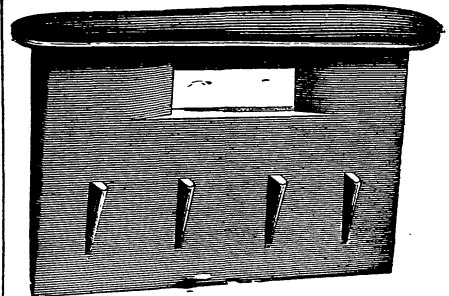
Unequalled for accuracy and quick work in cutting square or at any angle. Saves breakages, &c.

—ALSO—

IMPROVED TRAMMEL RULE for Cutting Circles
From 3 inches up to 48 inches, Segments, Gothic Shapes, &c.

Send for Circular.

The Canton Saw Co., Canton, Ohio.



I still manufacture and sell the above axe wedge, which has more practical merit than any other thus far made.

F. V. WOOSTER,

66 BEVERLY ST., BOSTON.

THE

"AUBURN" ICE TONGS.

For Quality of Workmanship and Price the "Auburn" excels all other tongs on the market.

SEND A TRIAL ORDER AND BE CONVINCED.

ROBERT STOPPARD,

Sole Manufacturer, AUBURN, N. Y.

Why Band Saws Break. Sixteen reasons and how to avoid them. Being instructions to filers on the care of large band-saw blades used in the manufacture of lumber. By JOSHUA OLDHAM. 90 pages, illustrated, cloth.....\$1.00
For Sale by David Williams, 96-102 Reade St., N.Y.



JONATHAN CROOKES & SON,

SHEFFIELD, ENGLAND,

Have placed the Agency for the United States for the sale of their celebrated

POCKET KNIVES, RAZORS, Etc.,

—: WITH :—

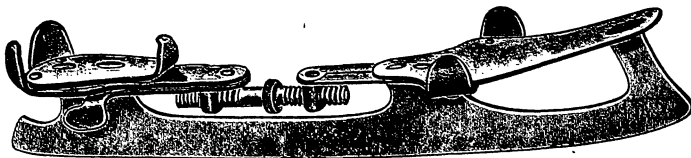
DAME, STODDARD & KENDALL, 374 Washington St., Boston, Mass.

Who intend issuing a new list at reduced prices which will embrace many new styles.

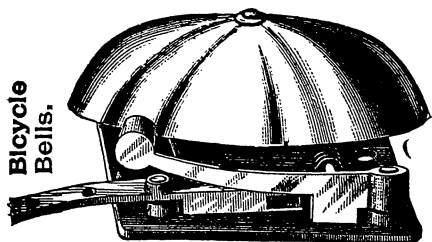
— ALSO DIRECT IMPORTERS OF ALL KINDS —

English, German, French and Swedish Cutlery.

The SAMUEL WINSLOW SKATE MFG. CO., Worcester, Mass., U.S.A.



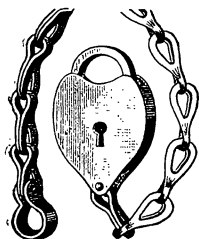
The most extensive Skate Factory in the World.



BEVIN BROS. MFG. CO., Easthampton, Conn.
Manufacturers of
Sleigh Bells, House Tea, Hand, Gong Bells, &c.

THE QUEEN ANNE SCREEN CO.,
Burlington, Vt.,
MANUFACTURERS OF

Improved Adjustable Window Screens.
THE QUEEN ANNE. With box panels; the only screen made and finished alike on both sides.
THE EUREKA. The best cheap extension screen on the market.
SCREEN DOORS. Finished all ready to hang. Sticks, Corners, Improved Frames, &c.
Write for circular and Price-list.



Bicycle Locks.
Bicycle Bells.

Especially Low Prices

We manufacture hardware specialties of all descriptions to order.

MAINES & ZIMMERMANN, 407 Cherry St., Phila.

A. S. HENN & CO.,

Manufacturers of

Hardware Specialties, Can Openers, Pocket Wrenches, Mining Knives, Clothes Line Pulleys, &c.

Send for Catalogue.

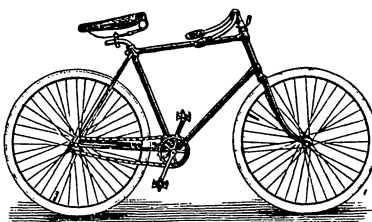
NEW HAVEN, CONN.



THE ONLY STANDARD BICYCLE

In the World at a Moderate Price is the

WAVERLEY.



IT IS THE ONLY MACHINE that is and will remain at a standard medium price in America. Every WAVERLEY sold this year brought \$100.00. They are still bringing \$100.00 while other makes reduced from \$150.00 will not sell beside them at \$85.00. Sell WAVERLEYS and make a profit. Sold direct to retailers. Catalogue and terms.

Indiana Bicycle Co., - Indianapolis, Ind., U. S. A.

**OUR
AMERICAN**

And Safety Hammer

Double Action in 32, 38 & 44 Cal.

H. & R. Imp. Ejecting Double Action,

H. & R. Imp. Automatic Double Action,
In 32 and 38 Caliber.

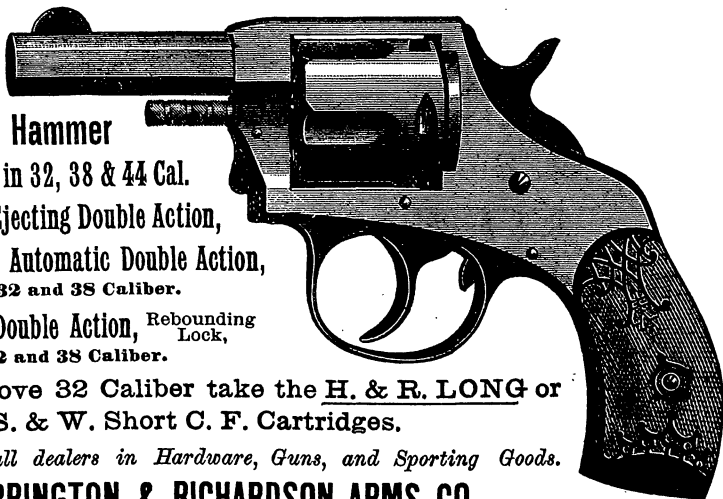
And Premier Double Action, Rebounding Lock,
In 32 and 38 Caliber.

All the above 32 Caliber take the **H. & R. LONG** or
S. & W. Short C. F. Cartridges.

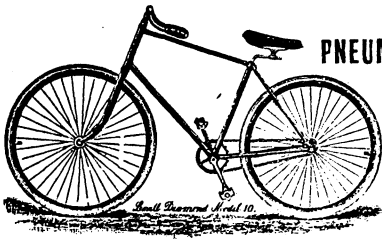
For Sale by all dealers in Hardware, Guns, and Sporting Goods.

HARRINGTON & RICHARDSON ARMS CO.,

Worcester, Mass., U. S. A.



Lovell Diamond Cycles



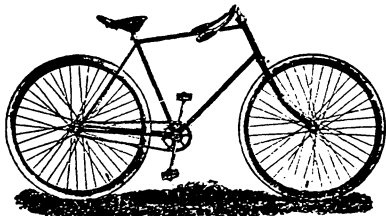
HIGHEST GRADE.
PNEUMATIC, CUSHION AND SOLID TIRES.
FOR LADIES AND GENTLEMEN.

MANUFACTURED BY
John P. Lovell Arms Co.

BOSTON, MASS.
CYCLE CATALOGUE FREE.

WESTERN WHEEL WORKS.

BICYCLE



MANF'TRS

From \$20

to \$135.

MOST COMPLETE LINE MADE.

OFFICE AND FACTORY:

Wells, Schiller and Sigel Sts., and N. Park Ave., Chicago, Ill., U.S.A.

A Wheel



Properly Designed,
Practically Made,
Combining Strength,
Durability and
Perfect Qualifications.
Such are the

S
O
L
D
SIGHT.

Dauntless

FALCON JUNIOR, for Boys.

FALCON JUNIOR COMBINATION, for Boys and Girls.

The only high grade juvenile wheels made. Full ball bearings, perfectly dust proof, 1½ in. pneumatic tire, 24 in. wheels, graceful drop handle bars, combination cork and rubber handles.

The bearings are turned out of solid bar steel, and all material and workmanship, are first-class. Made in the same manner, of the same stock, with the same care as the large wheels. Good juvenile wheels are scarce, and ours are going rapidly.

The W. Bingham Company, CLEVELAND, OHIO.

DETROIT CORK-SCREW CO., DETROIT, MICH., U. S. A.

Manufacturers of

The Davis Cork-Screw,
The Davis Knife and Cork-Screw,
The Puddefoot Cork-Screw,
Columbus and Greeley
Cork Extractors.

Manufacturers of

Cut Worm
Spiral Screws and
Cork-Screw Novelties.
Cut Worm Cork-Screws
for the Bar Cork Puller

Send for Price-List and Discounts.



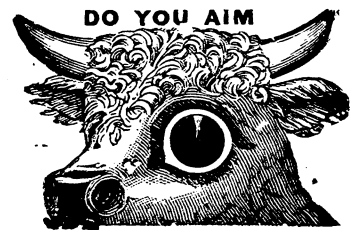
FIG. 3. Showing Davis cork-screw and fulcrum in position to pull cork.

Yacht AND Boat Hardware.

L. W. FERDINAND & CO.,

BOSTON, MASS.

Send for 212-Page Catalogue.



To Make a Bull's Eye

In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a HIT by sending for the IDEAL HAND BOOK.

IDEAL MFG. CO., New Haven, Ct., U. S. A.

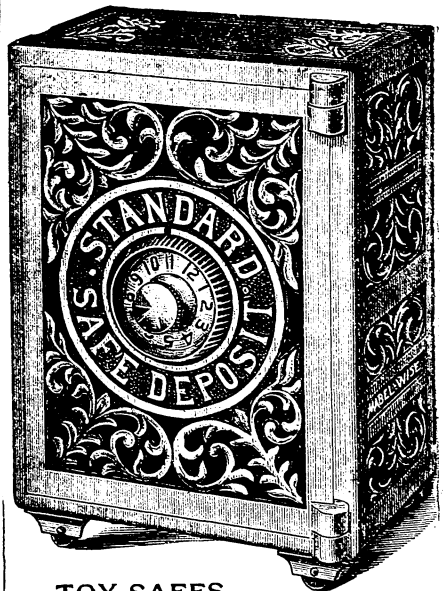
Please mention *The Iron Age* when you write.

The HENRY C. HART MFG. CO.,

DETROIT, MICH.

MANUFACTURERS OF

Hardware Specialties.



TOY SAFES.

The Sensible Saw Handle.



Sample
Sent
Free.

Made
only
by

Gwinner Mfg. Co.,
HAMILTON, O.

HARMON & DIXON, Agts., 118 Chambers St., N. Y.

THE IRON AGE HARDWARE PRICE BOOKS

ARRANGED BY

R. R. WILLIAMS,

Hardware Editor of *The Iron Age*.

BOOK A is arranged in blank form for entry of goods with cost and selling prices, giving classified headings and spacings for article, No. or size, purchased from, date, list, discount, weight, freight, net cost, regular, special. Size, 4 x 7; bound in grain seal leather. Four Editions, Price, \$1.00, \$1.25, \$1.50 and \$1.75

BOOK B is arranged in blank form for entry of goods with cost and selling prices, giving classified headings and spacings for article, No. or size, list, discount, net cost, regular, special. Size, 4 x 7; bound in grain seal leather. Four Editions, Price, \$1.00, \$1.25, \$1.50 and \$1.75

BOOK C is arranged in blank form for entry of goods with cost and selling prices, giving classified headings and spacings for article, No. or size, purchased from, date, list, discount, add, net, wholesale, retail, remarks. Size, 4½ x 8; bound in grain seal leather. Four Editions, Price, \$1.00, \$1.25, \$1.50 and \$1.75

BOOK D is arranged in blank form for entry of goods, with cost and selling prices, giving classified headings and spacings for article, No. or size, regular selling price, special selling price, purchased from, date, list, discount, net weight, freight, total cost (for store use or salesman on the road). Size, 5½ x 8 inches. Four Editions, Price, \$2.00, \$2.50, \$3.00 and \$3.50

BOOK E is arranged in blank form for entry of goods, with cost and selling prices, giving classified headings and spacings for article, No. or size, list, discount, add, cost, sell, mem. Special feature, multiple index, by means of three parallel marginal rows, affording reference to any article at a single motion. Size, 7½ x 10 inches. One Edition, Price, \$5.00

THE IRON AGE Standard Hardware Lists. For use in Price Books. Printed on thin, tough paper and on only one side of each page, to be trimmed and inserted in price books. Pamphlet. Price, 25 cents

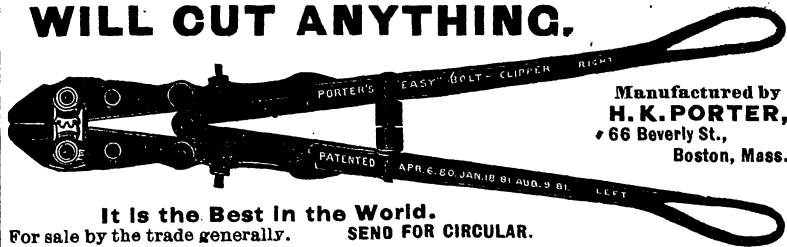
Sent, post-paid, on receipt of price, by

DAVID WILLIAMS

Publisher and Bookseller,

96-102 Reade Street, New York

THE "EASY" BOLT CLIPPER. WILL CUT ANYTHING.



Manufactured by
H. K. PORTER,
66 Beverly St.,
Boston, Mass.

23,000 Sold.

It is the Best in the World.
For sale by the trade generally. SEND FOR CIRCULAR.

BUSINESS ESTABLISHED 1798. INCORPORATED 1891.

JOS. F. McCOY CO.

26 Warren St., New York,

—Importers and Dealers in—

HARDWARE, CUTLERY, TOOLS**—AND—
RAILWAY SPECIALTIES.**

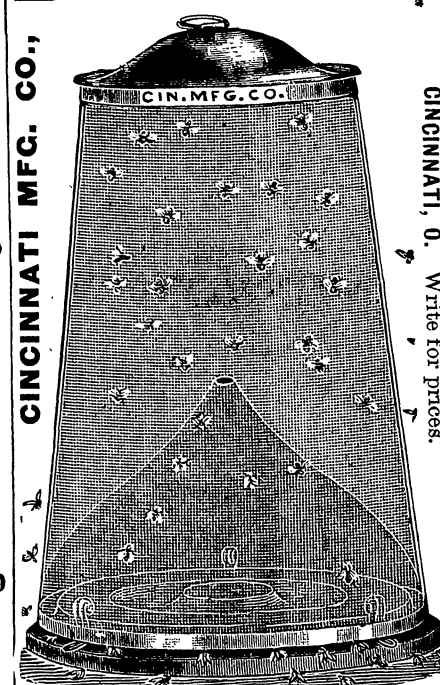
Headquarters for

POCKET CUTLERY.	{	Monarch Cutlery Co.
SCISSORS and TOOLS.		Irving Cutlery Co.
RAZORS, TABLE CUTLERY.	{	George Butler & Co.
SHEARS and SCISSORS.		Warrington Shear Co.
FRENCH BAND SAWS, TOOLS, &c.	{	Peugeot Frères.
FRENCH PLYERS and JEWELERS' TOOLS.		Gueutal & Sons.
PATENTED CLIPPERS for HORSES and BARBERS.	{	Coates Clipper Mfg. Co.
HYDRAULIC JACKS, BLOCKS and HOISTS.		Tangyes, Limited.
PATENT DIFFERENTIAL PULLEY BLOCKS.	{	Wm. Eades & Co.
RATCHET DRILLS.		Weston's Patent.
BRASS WIRE CLOTH.		Weiller & Co.

LEADER FLY TRAPS.

Corn Poppers and other Wire Goods.

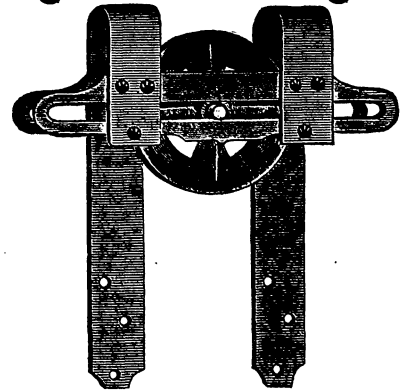
Manufactured by

**JOHN LOYD,**

Machine Knives, Shear Blades.
Presses and Dies.

Nos. 558 to 562 Water Street, New York

CHICAGO Big Twin Hanger.



Also a Complete Line of this
Class of Goods.

MANUFACTURED BY

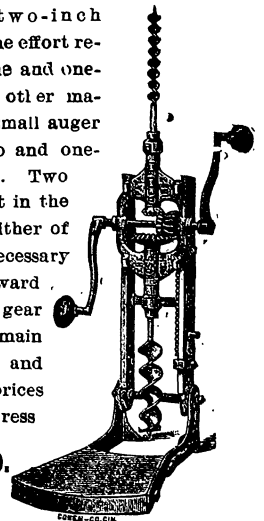
Chicago Spring Butt Co.,
Chicago, Ill.

The Boss 2-speed Boring Machine.

Will operate a two-inch auger with the same effort required in using one and one-half inch in any other machine, and for the small auger have a speed two and one-half times faster. Two augers may be kept in the machine, to use either of which it is only necessary to point it downward by first taking the gear frame out of main frame, inverting and replacing it. For prices and discounts address

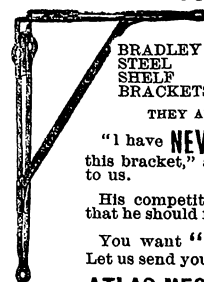
Buckeye Mfg. Co.

Union City, Ind



Break it Down!!!

—IF YOU CAN.—



BRADLEY
STEEL
SHELF
BRACKETS } ARE { STRONG,
LIGHT
ARTISTIC,
PROFITABLE.

THEY ARE GREAT SELLERS.

"I have NEVER HAD A CALL for this bracket," a certain dealer once said to us.

His competitor was taking good care that he should not.

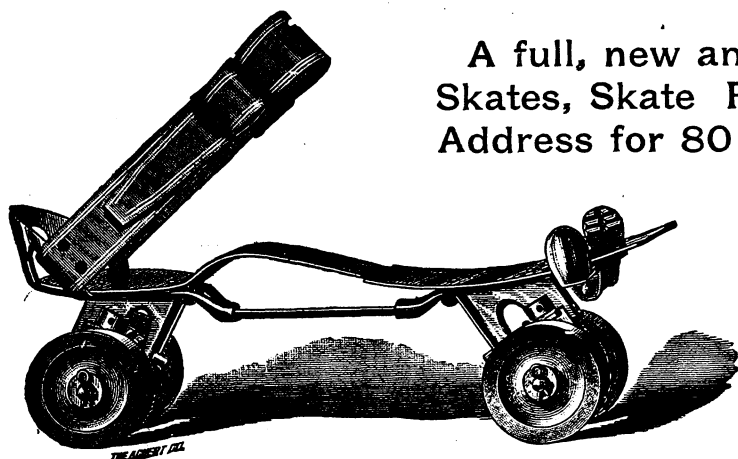
You want "TO BE IN IT" this fall. Let us send you our catalogue and prices.

ATLAS MFG. CO., New Haven, Conn.
SOLE MANUFACTURERS.

PAT. NOV. 8,
1899.

HENLEY'S CELEBRATED RINK

AND CLUB ROLLER SKATES.



A full, new and complete stock of Roller Skates, Skate Repairs and Rink Supplies. Address for 80 page catalogue and prices,

M. C. Henlev,
RICHMOND, IND.



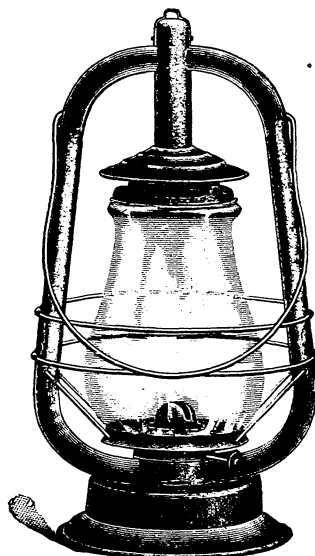
No!

That's not the way.

You just pull a little catch and the lantern opens itself. It's the slickest lantern I ever saw. Each tube is made of one piece of metal, with the turns round and smooth—not like the old kind of patched up, ugly elbows; I believe that makes her draft so fine. I tell you, she's a daisy right through. Had her along that night of the blizzard—that's the time to get acquainted with a lantern. Hadn't been for the "Surprise Tubular" that night I wouldn't be here now.

SOLE MANUFACTURERS:

Ohio Lantern Co.,
TIFFIN, OHIO.



SURPRISE TUBULAR.

This GUN has rebounding locks and the barrels can be taken off and put on again without cocking the arm, and when cocked the hammers may be let down gradually, and without the full force of the blow. It is simple in construction, having very many less pieces than any other hammerless gun.

Easily Tipped and Cocked,
Damascus Barrels,
Handsomely Engraved,
French Walnut Stock.

SEND FOR DESCRIPTIVE
CATALOGUE.



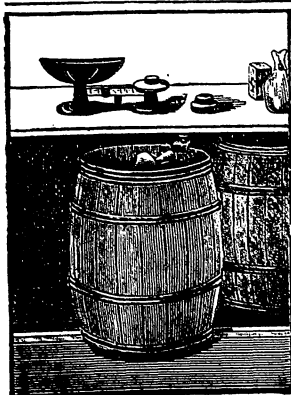
New Hammerless Double Gun,

MANUFACTURED BY

FOREHAND ARMS CO.

Worcester, Mass.,

PRICE VERY LOW.



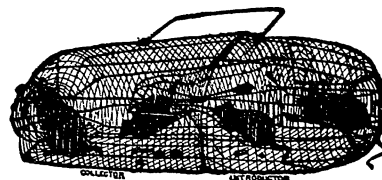
Wonder Somebody Didn't
THINK OF IT BEFORE!
The Perfection Barrel Swing.

A simple device, readily attached to any Pantry, Cupboard, Broad Shelf or under the counter in a Grocery or Hardware Store, for swinging a barrel to get at the contents easily. Price, \$1. All Hardware dealers will supply them.

MANUFACTURED BY

THE LEAVITT MACHINE CO.
ORANGE, MASS.

GENUINE **MARTY** RAT AND
MOUSE TRAPS
ALWAYS IN STOCK.



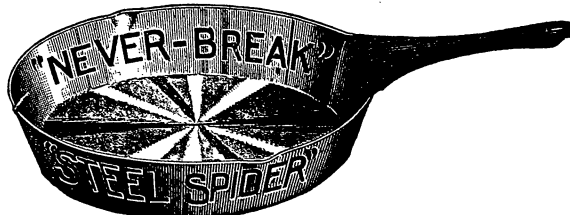
THEY DO THE WORK.
Orders solicited. Prices on application.
BURDITT & WILLIAMS,
20 Dock Square, Boston, Mass.
—SOLE AGENTS AND IMPORTERS.—

"PURITAN"COOKERS, COFFEE POTS AND
OTHER SPECIALTIES.Cooks Quicker than any other
Porcelain Rice Boiler made.**"NEVER-BREAK"**

Wrought Steel Spiders

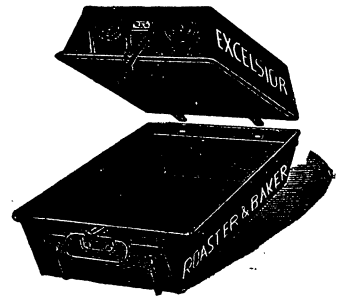
Wrought Steel Griddles, Kettles, Stew Pans, Stew Pots, Maslins,
Scotch Bowls, Hotel Sauce Pans, &c.

MIRROR POLISHED—TINNED—PORCELAINED.

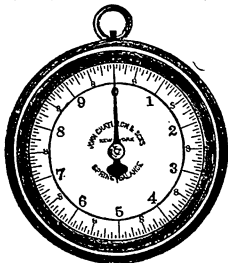


"MIRROR POLISH," the only Perfect Plain Steel Finish

SOLE MANUFACTURERS

THE BRONSON SUPPLY COMPANY,
CLEVELAND AND NEW YORK.**"EXCELSIOR"**Roasting and Baking Pan.
PLANISHED and PLAIN STEEL.**John Chatillon
& Sons,**

85, 87, 89, 91, 93 CLIFF ST., NEW YORK.

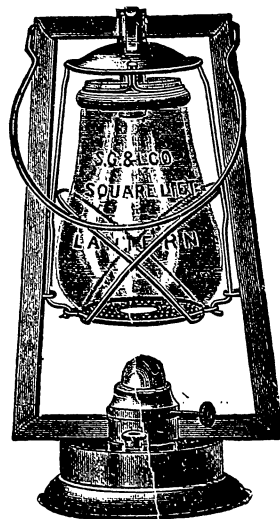
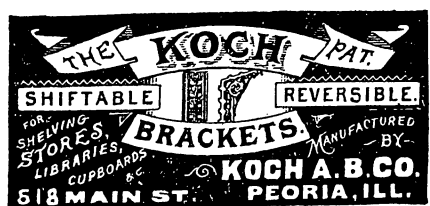
ESTABLISHED
1835.SEND FOR
PRICE LIST.MANUFACTURERS
OF
SCALES
—AND—
BUTCHER TOOLS.

Sole Agents for

Foster Bro.'s Butchers' Cutlery.



John Chatillon & Sons, N. Y.

Square Lift Wire Lan-
tern. Open.**Steam Gauge AND Lantern Co.**

Syracuse, N. Y.

Western Branch: 25 Lake St., Chicago, Ill.

—MANUFACTURERS OF—

**Standard Tubular Lamps and
Lanterns.**

THE BEST IN THE WORLD,

Tubular Lanterns,

Tubular Street Lamps,

Tubular Hanging Lamps,

Tubular Station Lamps,

Tubular Driving Lamps. etc.

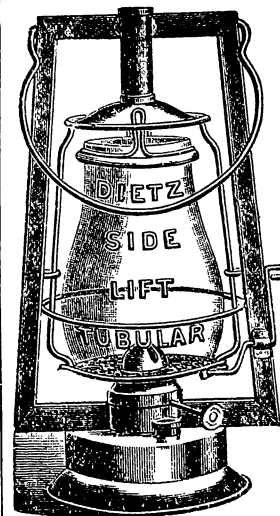
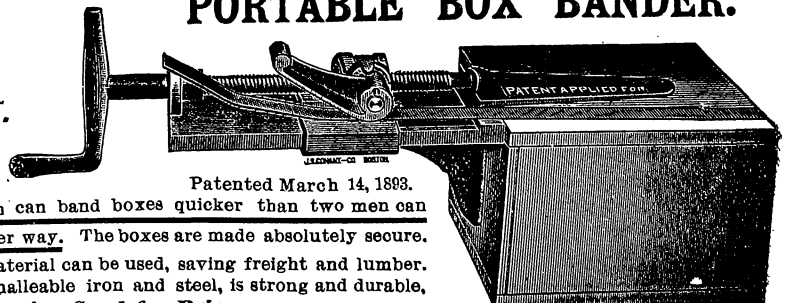
ESTABLISHED 1840.

A WORD TO THE WISE.When you purchase a Lantern, Street
Lamp or Driving Lamp, remember the**"DIETZ" Make**is the best. Our goods have stood the test of time
and are safe and reliable. The name "DIETZ" is
plainly stamped on them. Our specialty is Tubular
Lanterns, Street Lamps and Driving Lamps.
We make a large variety, being the oldest and largest
house in our line.

ASK FOR THEM!

R. E. DIETZ COMPANY,

New York, 60 Laight St. U. S. A. Chicago, 25 Lake St.

SOON
PAYS
FOR
ITSELF.**PORTABLE BOX BANDER.**

Patented March 14, 1893.

One man can band boxes quicker than two men can
in any other way. The boxes are made absolutely secure.
Lighter material can be used, saving freight and lumber.
Made of malleable iron and steel, is strong and durable,
weighs 8 pounds Send for Price.

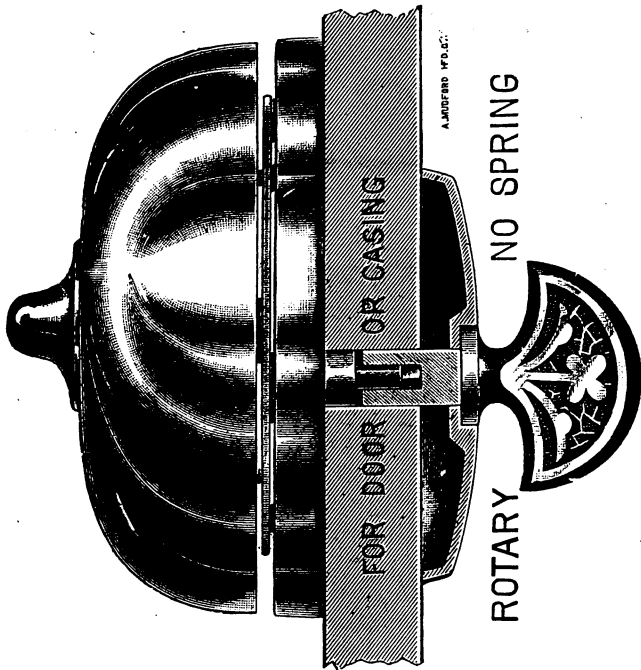
J. W. GOODELL, Manufacturer,

BURLINGTON, VT.

NEW DEPARTURE "ROTARY" DOOR BELLS.

ELECTRICAL RESULTS.

(PATENTED JULY 14, 1891; MARCH 29, 1892.)



Simply turning the knob about ONE-FOURTH IN EITHER DIRECTION produces about TEN CLEAR, FULL tones, which, though not startling or annoying, can be better heard all through the house than any bell ever made to imitate Electrical Results.

3 INCH.

No. 91, - - - - - Nickel Plated.
No. 92, - - - - - Bronze Plated.

PER DOZEN, \$20.00

3 1-2 INCH.

No. 101, - - - - - Nickel Plated.
No. 102, - - - - - Bronze Plated.

PER DOZEN, \$24.00.

No. 101 and 102.

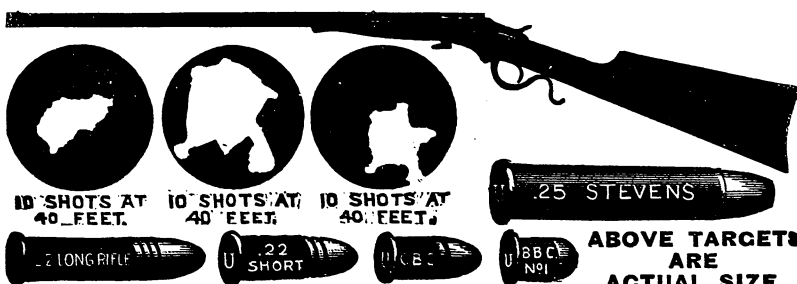
LIBERAL DISCOUNT TO THE TRADE.

JOHN H. GRAHAM & CO., 113 CHAMBERS ST., NEW YORK CITY.

GENERAL AGENTS.

A Triumph in Small Bore Rifles.

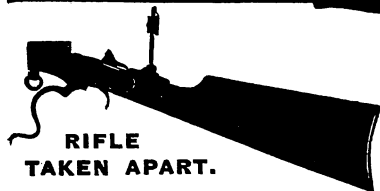
STEVENS' "FAVORITE" RIFLE.



Made for the 22 or 25 Rim Fire Cartridge.

WEIGHT, 4 3/4 POUNDS.

22-INCH BARREL.

LEVER ACTION LIKE SHARPS.
TAKEN APART IN TEN SECONDS.IT IS SIMPLY IMPOSSIBLE
TO MAKE MORE
ACCURATE SHOOTING BARRELS
THAN ARE ON THIS RIFLE.

No. 17. Plain Open Sights.....\$12.50
No. 18. Vernier, Open Back, and Beach Front Sights..... 17.00
No. 19. Lyman Peep, Open Back, and Lyman Front Sights, 17.00

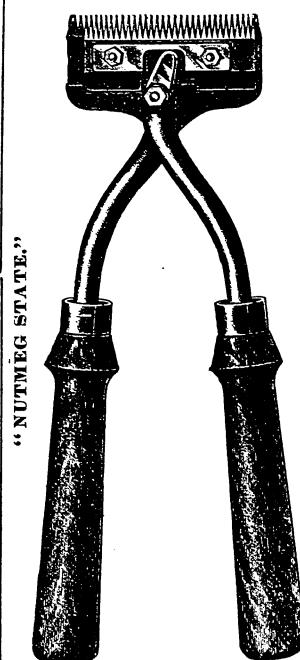
A 60 Page Catalog showing our full line of Fire Arms with TRADE PRICE LIST sent with pleasure to all dealers.

J. Stevens Arms & Tool Co.,

P. O. Box 5729.

Chilcopee Falls, Mass. U. S. A.

Edward S. Hotchkiss,

MANUFACTURER OF HARDWARE,
BRIDGEPORT, CONN.

SATISFACTORY PRICES. Standard goods. Don't fail to write when in want of Horse and Barber's Clippers, No. 20 Steel Rat Killers, Curry Combs, Metal and Wood Choker Mouse Traps Lemon Squeezers, Baxter Pattern Wrenches, &c., &c.

AMERICAN TOOL COMPANY,
NEW YORK,
MANUFACTURERS OF

TOOL CHESTS

Of all sizes, complete with tools for Hardware, Toy, Notion and Variety trades.
Factory and Salesroom,

200 West Houston Street, near Varick.
Also Machinists' Tool Chests, empty. Illustrated Catalogue and prices furnished on application.

No. 4 RATTAN MIXED BROOM.

The Best Warehouse, Stable, Shop, Factory and Railroad Broom in the Market.

Made of Broom Corn and Rattan Reed mixed together, flat in shape, with an iron band, as shown in the cut, making it solid, substantial, and stiff, for handling the heaviest dirt. Will last longer than any other similar broom.

Brooms and Brushes for Railroad Shops, Warehouses, Street, Stable, Bloom, Chill, Casting and Moulding purposes a specialty. Write for prices.

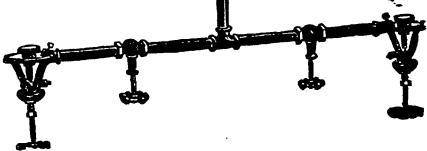
JOSEPH LAY & CO., RIDGEVILLE, IND.



Reliable Torches are what you want.



Made either for Oil or Gasoline.



These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

Write us for prices. A liberal discount given to the trade. Manufactured by THE SCHNEIDER & TRENKAMP CO., Nos. 479 to 497 Case Ave., Cleveland, Ohio



Dangler
Electric
Torches
FOR
GASOLINE
OR
OIL
14 JETS OF LIGHT



3 to 6
INCHES
LONG.

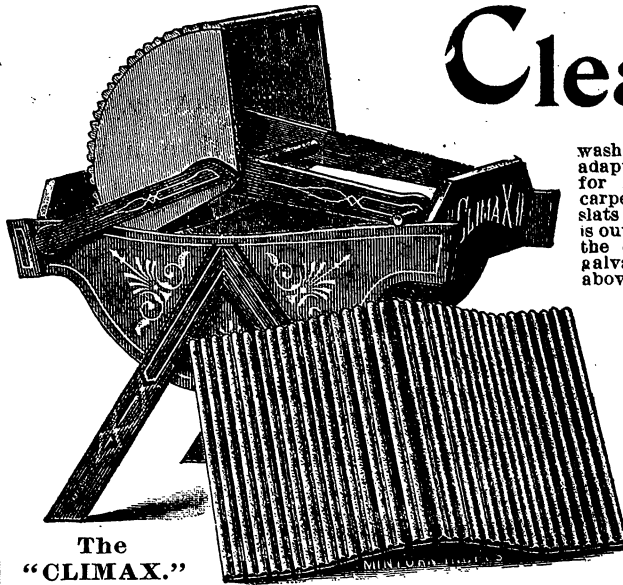
FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable brilliant, steady light, and by cheaper means than by Coal Gas.

SOLE MANUFACTURERS,

The Dangler Stove & Mfg. Co
Cleveland Ohio

JACKETED KETTLES
HOLLOWARE.

THE STUART & PETERSON CO.,
Philadelphia, Pa., and Burlington, N. J.



Cleanest

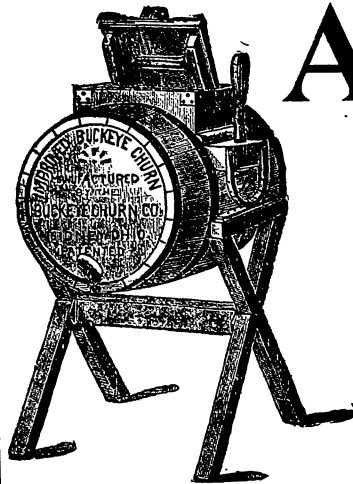
washing machine made, especially adapted for family washing, also for rubbing out grain sacks, carpets and bedding. The bottom slats are adjustable. The rubber is out of the way when handling the clothes. The bottom is of galvanized iron No. 27. And, above all, please recollect this is no

EXPERIMENT.

Write for Prices and Discounts.

— THE —
STEARNS MFG. CO.,
CONNERSVILLE, IND.,

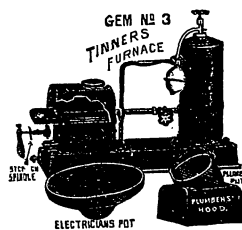
Manufacturers of
CLIMAX WASHER, CLIMAX
WOOD and CHAIN PUMPS, ETC.



A Buckeye

Churn is the best for making butter quick, cleanly and rapidly. There are others, but none its equal. A child delights in operating it. Order a sample. See if it doesn't sell quick. Our Queen Washing Machine is another excellent household adjunct, cheap but good. Agencies given. Write

BUGKEYE CHURN COMPANY,
SIDNEY, OHIO.



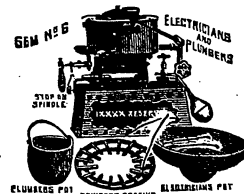
Burgess Gem Gasoline Furnaces.

All are equipped with the cylindrical slotted burner. For sale by all first class jobbers, or write us for descriptive circulars.

BURGESS SOLDERING FURNACE CO.,
J. BURGESS & SONS, Props. and Mfgs.,
Columbus, Ohio.

PRICE-LIST:
No. 3 and 4, Tin Reservoir, \$7.00 ea.
No. 3 and 4, Copper " 8.50 ea.
No. 6, XXXX Reservoir, 7.50 ea.
No. 6, Copper " 9.00 ea.
Plumbers' Pot for No. 3, 50¢ ea.
Electricians' Pot for Nos. 3, 4 and 6, 50¢ ea.
Printers' Grating for Nos. 4 and 6, 50¢ ea.

All guaranteed to work out of doors or on roofs. Nos. 4 and 6 will melt metal and heat coppers at the same time.



BOOKS.

YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS**, Publisher and Bookseller 96-102 Reade Street, New York.

ENTERPRISE LAWN SPRINKLER.

No. 1, \$3.50; No. 2, \$2.75.

Indispensable
to a well kept
Lawn.

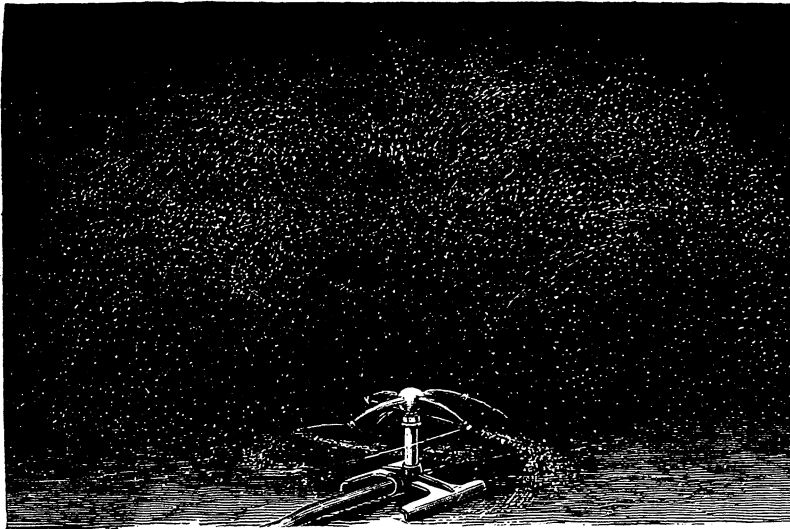
A Sprinkler
which will work
satisfactorily in
spite of muddy
water.

May be easily
moved from
place to place
without going
near it

SOLD BY ALL
HARDWARE DEALERS.

SEND FOR CATALOGUE.

THE ENTERPRISE MFG. CO., of PA., 3d and Dauphin Sts., Philadelphia. Branch Office, with J. C. McCarty & Co., 97 Chambers Street, N. Y.

**ADVANTAGES:**

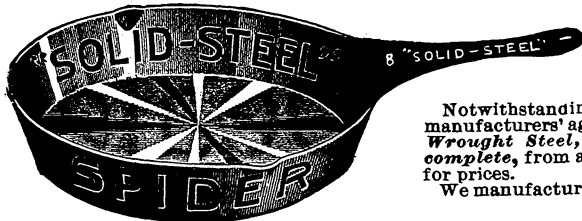
1st. Each machine is furnished with a cord or rope, so that the sprinkler may be easily moved, when running, without going near it.

2d. The water passes through a strainer before it enters the small perforations, which are thereby prevented from clogging up.

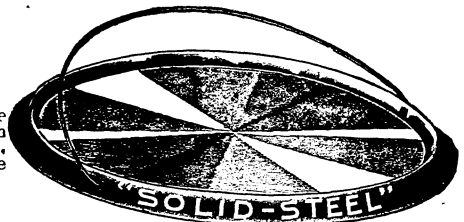
3d. It is so constructed that the weight of its revolving parts is removed by the pressure of the water, thus overcoming unnecessary wear.

4th. All parts of the machine are made sufficiently strong for ordinarily rough usage and are interchangeable.

5th. The machine is TINNED and NICKEL PLATED and is of very handsome appearance.

"SOLID-STEEL" SEAMLESS HOLLOW WARE.**BRILLIANT FINISH.**

Notwithstanding the claims made by some manufacturers' agents, our spiders are made from *Wrought Steel, Without Seams or Rivets, complete, from a single piece of metal.* Write for prices.
We manufacture our own goods.

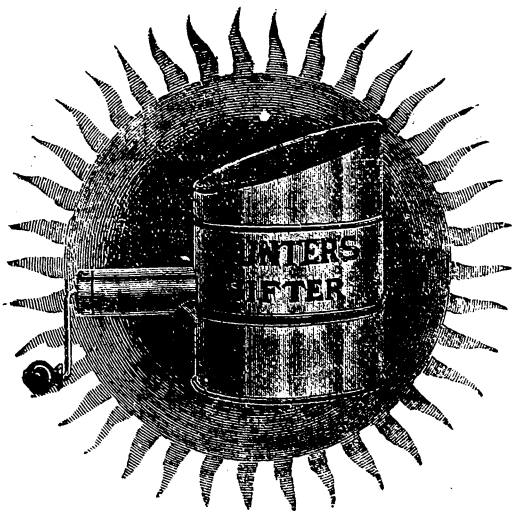


No Seams, no Rivets in "Solid-Steel" Ware.

Made either with Balls or Solid Handles.

The Cleveland Stamping & Tool Co., Cleveland, O.

We are in shape to figure on light and heavy stamping, and in addition to the above we build Dies and Stamping Machinery.

**Imitations**

of the famous Hunter's Sifters are now plentiful, the fact, nevertheless, is that there's but one genuine Hunter Sifter, that's the one we are making and which we ask you to buy.

—ADDRESS—

FRED J. MEYERS MFG. CO.,
COVINGTON, KY.

**PROFIT MAKING**

articles. Something every dealer is looking for. The Anthony Wayne Washer is one. You can readily prove this by ordering a sample machine. You won't have to sell it—it sells itself.

THE ANTHONY WAYNE MFG. CO., - Ft. Wayne, Ind.

The Sun Manufacturing Co.,

Successors to the Jno. M. Waddel Mfg. Co.,

ARE SOLE OWNERS AND MANUFACTURERS OF

**Waddel's Improved Coffee Mills,
Cathedral Gong Money Drawer and Surprise Rat Traps.**
Beware of Infringements.—We will protect our Patents.

"THE 'SUN' ONLY, SHINES FOR ALL."

A New Name, A New Reputation,

A New Line of Coffee Mills

That under the SUN Brand shine as leaders.

RAPID GRINDERS that will STAND THE WEAR.

STEEL ALLOY BUHRS,

A metal of recent discovery for this purpose used solely and only by the SUN. Warranted to outwear, outgrind and outsell any Coffee Mill ever put on the market.

We Challenge a Competing Test for Rapid Grinding and Wearing Surface.

Our New Line bears the Sun Trade Mark and is labeled Steel Alloy Buhrs.

Write for Our Catalogue and New Prices

Order a Sample Mill.

THE SUN MANUFACTURING CO.,

Greenfield, Ohio, U. S. A.,

MANUFACTURERS OF

Cash Registers, Money Drawers, Coffee Mills and Wooden Ware Specialties.



Say! As a Dealer

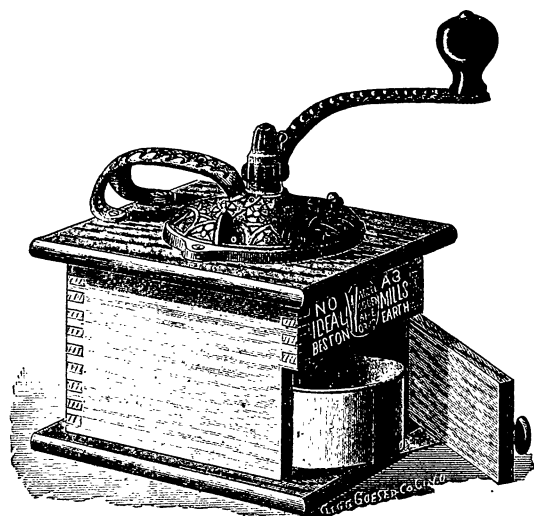
Have't you handled a variety of washing machines; some poor, some not much better and some of the best? And now you're looking for perfection. This is found only in

NEFF'S

Order one and see for yourself if it's not so.

W. H. NEFF, - - COWAN, IND.

"BIG W. W. W. W. FOUR."



A certain company are claiming to be "sole manufacturers of Waddel's Coffee Mills," ("If you see it in the sun its so"). The statement is designed to mislead the trade. The old line of Waddel's Coffee Mills, which have been on the market the past five years, are not manufactured by us. We are making a new line of Coffee Mills which are guaranteed to grind twice as fast as similar goods, and each mill is labeled under a trade-mark "Ideal Coffee Mills manufactured by Waddel Woodenware Works; best on earth." Specify the new goods and order "Ideal Mills," and our word for it, you will not make a mistake. Address plainly

Waddel Wooden Ware Works or "4 W.,"

Greenfield, Ohio.

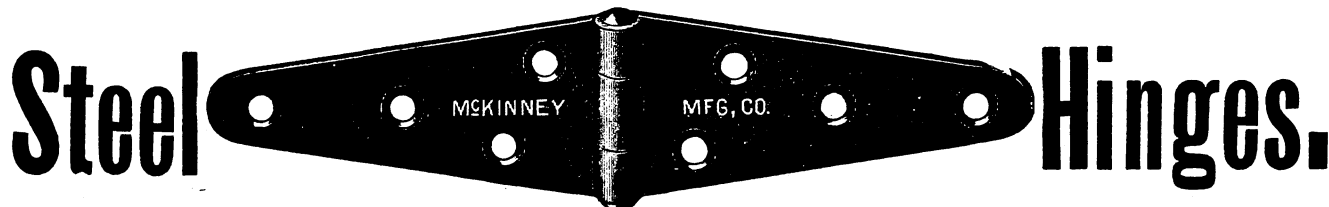
MANUFACTURERS OF

CASH REGISTERS, MONEY DRAWERS, COFFEE MILLS, RAT TRAPS and NOVELTIES.

WE CLAIM

That one pair of our Celebrated Steel Hinges will outwear two pair of the Flimsy Invention now being forced upon the attention of the trade.

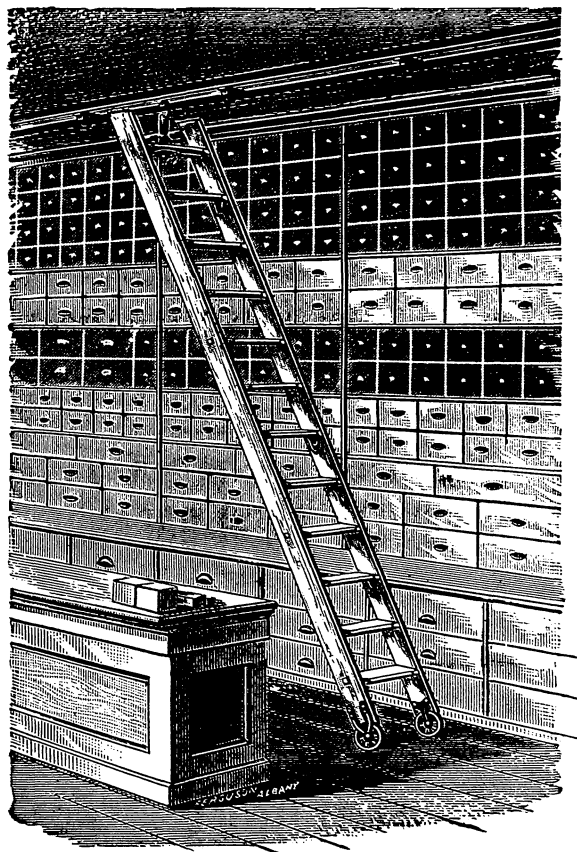
McKINNEY MFG. CO., ALLEGHENY, PA.



SEND FOR LIST.

"NONE BETTER."

THE "NOISELESS" STORE LADDER.

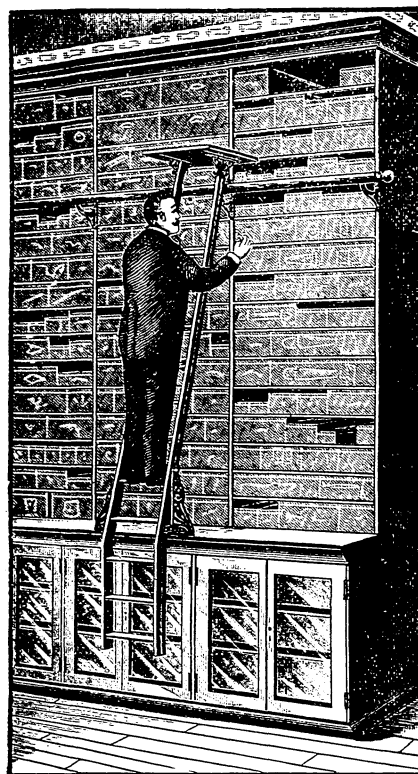


The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

M. CROISSANT,

ALBANY, N. Y.



THE BICYCLE STEP LADDER

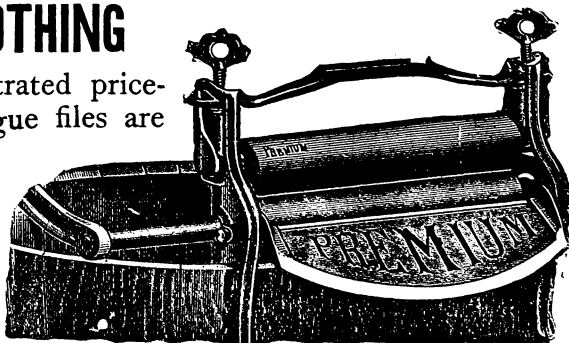
The Newest, Neatest, Simplest, Easiest Operated and Safest Store Ladder made.

Ladders are not Suspended, but Supported from below on wheels. Move easier with operator on than others when empty. Highly finished, and very handsome. Made in different grades and prices to suit. Send for illustrated catalogue and prices. See this space next week for other styles.

The Bicycle Step Ladder Co., 50 State Street, Chicago, Ills.

IT COSTS NOTHING

to send for our illustrated price-list, and your catalogue files are incomplete without it. Write to the Factory, Montpelier, Vt., or to our Chicago store, 68 Lake St.



COLBY WRINGER COMPANY.

HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

MANUFACTURED ONLY BY

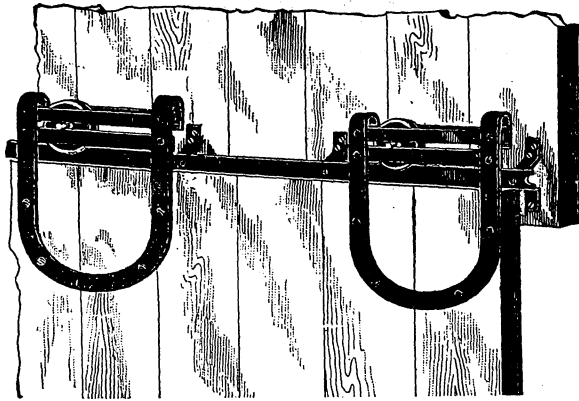
"THOMAS MORTON,"

65 Elizabeth Street,

Write for Prices.

NEW YORK.

BOOKS. YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, New York.



Lane's Patent Steel Barn Door Hangers,

"O. N. T." Track for same.

The first Anti-friction Steel Door Hanger placed upon the market and to-day stands as the original and best. Sold in all the States of the Union, as well as abroad. Also Lane's Noiseless Steel Parlor Door Hanger, using Single Steel Track, a great success.

Lane's Pat. Self-measuring Faucet, measuring liquids as drawn. Swift's Coffee Mills in great variety.

Manufactured by **LANE BROS.**, Poughkeepsie, N. Y.

JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., NEW YORK.

"He had also in his possession 55 skeleton keys which the police claim would open any door."—Chicago Tribune. **You are selling** that kind of a lock to your customers every day. **Sell** a lock that has a guar-

KEYLESS LOCK CO., 194 So. Canal St., CHICAGO, - ILL.

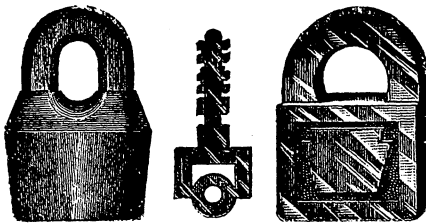
an-
tes against
Sneak Thieves.
It don't cost you any
more and is sure to give
you customers more confidence
in you and your goods. **THE
CRAIG LOCK CANNOT BE
PICKED.** That's
our guaran-
tee.

KEYSTONE LOCK WORKS,

—Established 1879.—

E. T. FRAM, Lancaster, Pa., U. S. A.

MANUFACTURER OF



Patent Inter-Locking Tumbler Scandinavian or Jail PADLOCKS, in 56 grades and sizes. Key and Self-Locking. Brass, Bronze, Steel and Malleable Iron. Red, Black, Bower-Barff and Bright Brown finish. Also a full line of fine flat padlocks in Bronze and Steel. All fully described and illustrated in our new catalogue, furnished free to the trade.

SURPLESS, DUNN & ALDER,

General Agents, 97 Chambers St., New York.

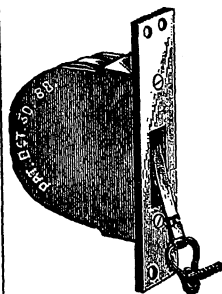
PATENT PERFECTION PADLOCK

Eight Tumblers. Key Turning Both Ways.

Sizes; $\frac{1}{4}$ inch to $2\frac{1}{2}$ inches; of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{2}$ and $\frac{3}{4}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world. Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

Send for Price Lists and Circulars.



Merit Always Wins. THE CALDWELL SASH BALANCE

Has been the standard for five years.

Write for our new catalogue of Hardware Specialties.

CALDWELL MFG. CO., Rochester, N. Y.

READING HARDWARE CO., Agents.

81 Reade St., New York.

514 Commerce St., Philadelphia.

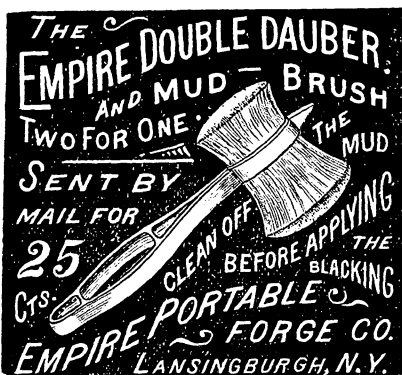
73 Wabash Ave., Chicago.

SHEETS, COOKING UTENSILS, MEDALS,

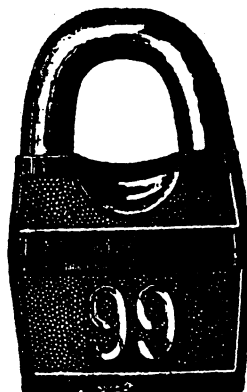
Sheets and Rivets for Boats
and Coffins.

Bars for Horse Shoes.

ILLINOIS PURE ALUMINUM CO.,
LEMONT, ILLINOIS.



N. Y. Office, 103 Chambers St., W. H. QUINN, Manager



Real Bronze Fancy
Scandinavian

PADLOCKS

Four Tumblers. Attractive Design. Plated Keys.
Fully Guaranteed. Sold by best Jobbers. The
most Profitable Jail Locks the Trade can buy.

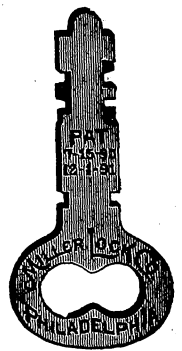
No.	Keys.	Weight.	Per Doz.
99	2	4 oz.	\$6 00
999	2	8 "	8.00
12	2	"Bull Dog."	6.00
13	2	" "	8.00

Illustrated Catalogue No. 10 free to all dealers.

You are cordially invited to see the assortment we
exhibit in Manufacturers Building, Chicago.

Miller Lock Co., Lock Mfgs.,

4515 TACONY STREET



PHILADELPHIA

SOLID BRAIDED SASH CORDS, &c.

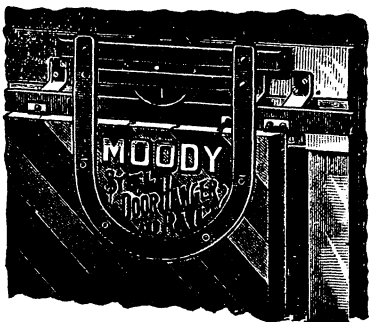
Picture Wire, Bright Wire Cords, Picture Nails,

Picture Hooks, Knobs, Chain and Wire Brads.

Mason Lines, Chalk Lines, Clothes Lines, Spool Wire,

OSSAWAN MILLS CO., Norwich, Conn

VICTOR MFG. CO., Newburyport, Mass. STEEL RAIL.

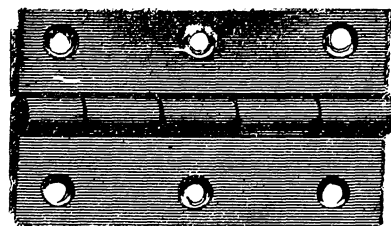


Showing one-half set of hangers attached to door.



The Only Bracing Bracket Made.

PRICE-LIST.		
HANGERS.		Per Doz. prs.
No. 5, to run 6 feet, 3 1/2 in. wheel,	-	\$10.00
No. 6, to run 10 feet, 4 1/2 in. wheel,	-	15.00
No. 7, to run 15 feet, 5 1/2 in. wheel,	-	22.00
RAIL, per foot.....		6 1/2 cents



Cast Brass Butt Hinges

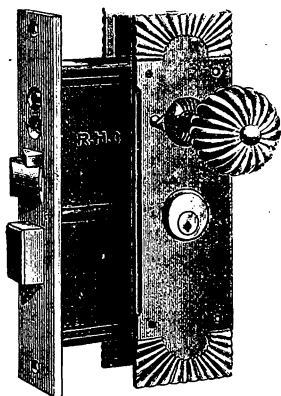
IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York,

MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.**



Artistic Designs IN BRONZE HOUSE TRIMMINGS. LOCKS AND HARDWARE

For Residences and Public Buildings.

"VASSAR"

CYLINDER LOCKS AND LATCHES.

READING HARDWARE CO.

NEW YORK. PHILADELPHIA. CHICAGO.

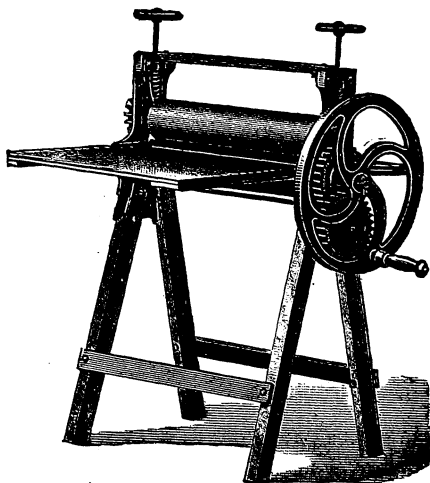
FACTORIES AT READING, PA.

The Family Mangle.

WARRANTED TO DO

Better Work than Hand-work.

SAVES all the fuel,
two-thirds the work.
Keeps the linen whiter.
We Guarantee Every Machine.



Send for descriptive circular to
S. C. Johnson, Racine, Wis.
Agents Wanted.

ACME CUTTING TOOLS.

Made in all Sizes.



SOLID STEEL ACME PLIER
AND WIRE CUTTER.
Made with cutters of best steel.

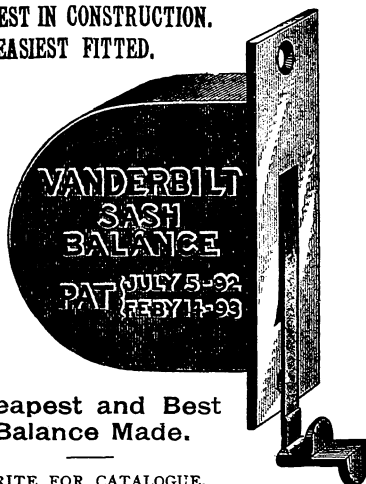
ACME CUTTING NIPPER.
Jaws of Choicest Tool Steel, dove-
tailed into the head, making it as
strong as solid steel.



HIGGANUM HARDWARE CO., HIGGANUM, CONN.

New York Office, 18 Cliff Street.

SIMPLEST IN CONSTRUCTION.
EASIEST FITTED.



Cheapest and Best
Balance Made.

WRITE FOR CATALOGUE.

**The Vanderbilt Sash Balance Co.,
CANANDAIGUA, N. Y.**

General Agents, Harmon & Dixon, 118 Chambers St.
New York.

THE GEM SOLID STEEL MINCER



Single
and
Double Blades.

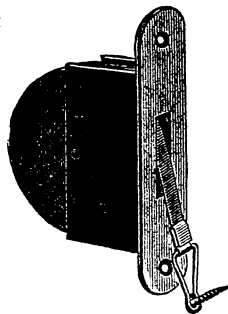
Handle and Blade Formed in one piece.
Always Clean. Indestructible.
No Rivets to Wear Loose.
No Wooden Handle to Shrink, Swell, Loosen,
Split, or Fill with Rancid Grease.

MANUFACTURED BY

PALMER HARDWARE MFG. CO.

TROY, N. Y.

AN ACTUAL NECESSITY with Architects, Builders, and Railroad Corpora- tions.



Simple, economical,
and low in price.

By using a steel
frame our balance is
much superior to
other makes.

Can be applied to
old as well as new win-
dows.

Requires no box
frames.

Warranted 15 years.

Cord lasts 5 years.

Write for price-list.

PULLMAN SASH BALANCE CO., Rochester, N. Y.

New York Office, 142 Chambers St.

Chicago Office, 235 Lake St.

COMMON SENSE SASH BALANCE.



The Best and most Practical
substitute for weights invented.
The most Durable, the Cheap-
est and best device for all
ordinary windows. Balances
when in position are out of
sight. No rivets, bolts or
screws are used in putting it
together, so that nothing can
get out of order or need repair-
ing. No cutting, boring or
marring the sash, as the Bal-
ances are let into the jamb.

Manufacturers of Sash Balances, Sash
Locks, Sash Lifts, Monitor
Sash Irons.

STEWART & BAKER,

107 State Street, Rochester, N. Y.

No
more **S**lamming!
...Doors!

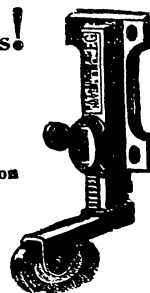
Our Combination


**Door Check
Lock and
Bumpers**

For sale by all Jobbers. Write
for Circulars.

Unity Door Check Co.,

234 Lake St., Chicago, Ill.





FROST'S ANTI-RATTLE
 Pat. Jan. 20, 1880.
 Out One-half Size.
 Sample pair sent to any hardware or saddlery firm by addressing
The Frost Thill Spring Co.,
 Boston, Mass.

THE WILCOX & HOWE COMPANY,
 BIRMINGHAM, CONN.,
 MANUFACTURERS OF
A Full Line of Carriage Hardware
ALSO SPECIAL FORGINGS.
 Estimates cheerfully given. Send for Catalogue

IDEAL SASH PULLEY.



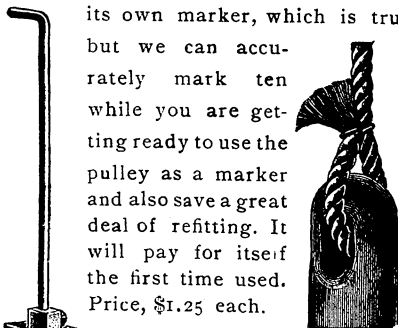
A 4-Hole Auger Mortise Cone Axle Pulley. Applied without chisel or screws. Each Pulley its own marking gauge. A variety of Styles and Sizes to Select from. Ask for Catalogue of Hardware Specialties
STOVER MFG. CO.
 145 River St., Freeport, Ill.

WE CLAIM
 THAT

Grennan's Sash Pulley Marker

For Common Sense Pulleys is a necessity although it is claimed that each pulley is

its own marker, which is true, but we can accurately mark ten while you are getting ready to use the pulley as a marker and also save a great deal of refitting. It will pay for itself the first time used. Price, \$1.25 each.



Throop's Sash-Weight Fastener

Saves 2 cents a window in cost of material, saves time and makes a neater and better job than tying a knot. Send for prices and circulars.

J. W. Skelly & Son, - BRISTOL, CT.

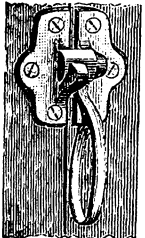
P. J. Conroy & Co.,

Paschall, PHILADELPHIA.

"CONROY"
Refrigerator Door
Fasteners

Have rapidly supplanted all others.

Refrigerator Trimmings



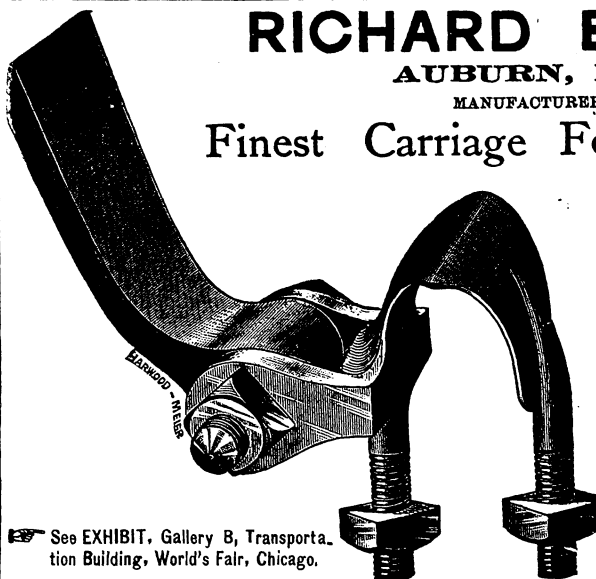
Pat. Dec. 15 85.



All Tags and Labels on Covert Goods bear the above Trade-Mark, and are sold by all Leading Jobbers in General and Saddlery Hardware at Manufacturers' Prices.

COVERT MFG. CO.,

WEST TROY, N. Y.

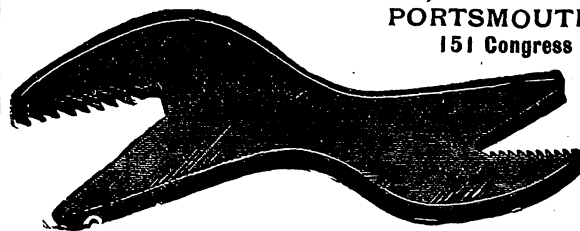


RICHARD ECCLES,
 AUBURN, N. Y.,
 MANUFACTURER OF
 Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line Special Drop Forgings.
 See EXHIBIT, Gallery B, Transportation Building, World's Fair, Chicago.
 Send for Catalogue.

"ALWAYS READY" WRENCH.

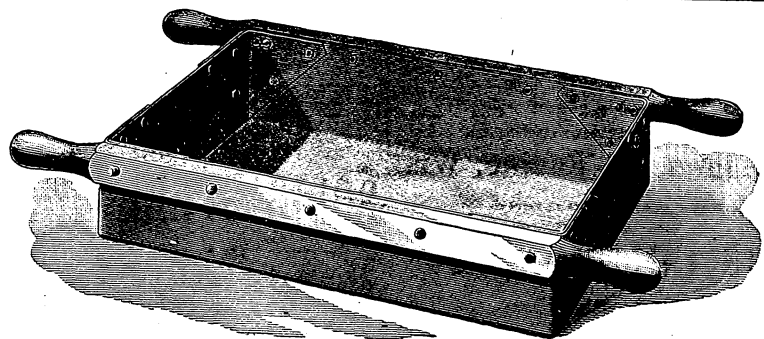
FORGED STEEL, NICKEL PLATED.

PORTSMOUTH WRENCH CO.,
 151 Congress St., Boston, Mass.



SEND FOR PRICES.
 Machinists, Carriage Makers, Blacksmiths, Mechanics, Spinners, Weavers, Carders, and in all Departments of Woolen and Cotton Mills, Farmers, Housekeepers, and in fact everybody that ever uses a wrench

NEEDS THIS ONE.

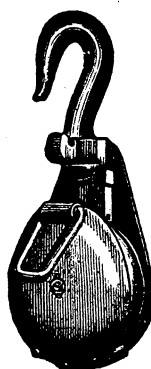


STEEL HAND-BARROWS.

Light, Strong, Durable, Convenient, Cheap:
W. J. CLARK & CO., - Salem, Ohio, U. S. A.

Manufacture To Order
 SPECIALTIES & NOVELTIES, PATENTED ARTICLES,
 HARDWARE GOODS ETC., SMALL OR FINE MACHINERY.
 SEND FOR CATALOGUE - CORRESPONDENCE SOLICITED
OTTO KONIGSLOW CLEVELAND, O.

WHY USE WOODEN OR HEAVY STEEL BLOCKS WHEN THE STEEL AND IRON TACKLE BLOCKS



—MADE BY—
The Cleveland Block Co.

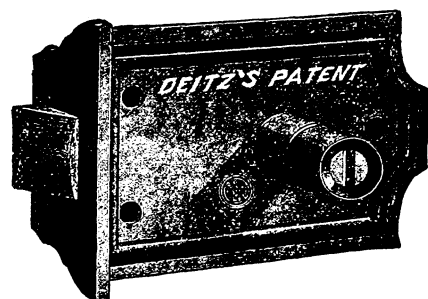
CLEVELAND, OHIO, U. S. A.,

ARE BETTER IN EVERY WAY.

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.

General Agents: Topping Brothers, 92 Chambers Street, New York.
The H. Channon Co., 22 Market Street, Chicago.
New England Agents: - Dodge, Haley & Co., 212 High Street, Boston.

A. E. DEITZ



No. 109 Latch.

J. C. McCARTY & CO., Agents,
97 Chambers and 81 Reade Sts., New York.

Factory, BROOKLYN, E. D., N. Y.

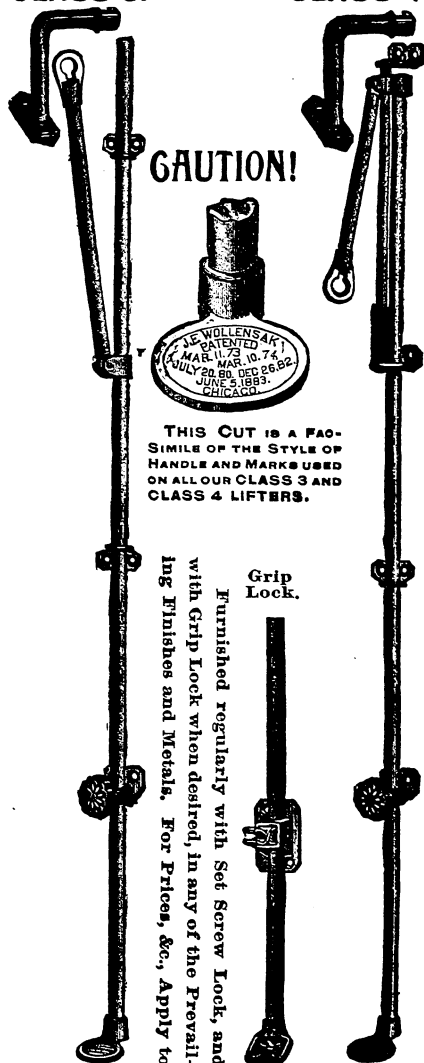
Transom...Lifters

OLD RELIABLE

J. F. WOLLENSAK'S PATENT.

CLASS 3.

CLASS 4.



CAUTION!

THIS CUT IS A FAO-SIMILE OF THE STYLE OF HANDLE AND MARKS USED ON ALL OUR CLASS 3 AND CLASS 4 LIFTERS.

Furnished regularly with Set Screw Lock, and with Grip Lock when desired, in any of the Prevailing Finishes and Metals. For Prices, &c., Apply to

J. F. WOLLENSAK, CHICAGO, ILL.

SASH WEIGHTS

E. E. BROWN & CO.,

McKean and Meadow Sts.,

PHILADELPHIA PA.

STEEL. WOOD OR IRON MADE BY TOLEDO BLOCK WORKS.

511-513-515 Water St., TOLEDO, OHIO,

WILL PROVE SATISFACTORY

TO USER.



SHUBERT & COTTINGHAM,

MANUFACTURERS OF

KEYSTONE



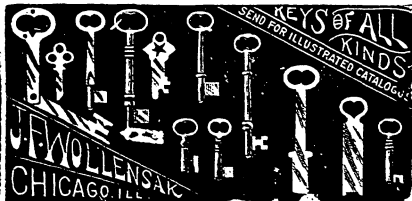
BRAND.

Round Edge Tackle Blocks,

118 North Delaware Avenue,
Factory, Beach and Norris Sts., PHILADELPHIA.

GENERAL AGENTS:
BRITTAN & BOND,

154 Lake St., Chicago, Ill.



NONPAREIL

Ratchet Wrenches.

Made of best forged Tool Steel; are easily and readily adjusted and controlled. Can be made reversible instantly without removing from their work by throwing over the lever in slot of the handle.

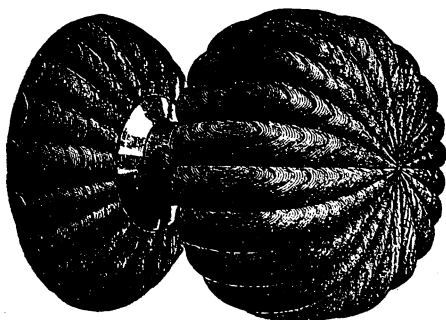
The Set of Combination Tools No. 1 includes the wrench, two sockets, one for screw-driver, bit or reamer shank with wood handle, and one socket



for drill shank and feed nut. The jaws on this wrench open from 3-16 to 1 1/4 inches.

Send for Illustrated Circular and Price-list of various sizes

The Keystone Mfg. Co.,
312 Terrace, Buffalo, N. Y.



WOOD DOOR KNOBS,
DOOR SPRINGS AND CHECKS
AND CHECKING SPRING HINGES.

NEW GOODS. NEW PRICES.

Send for New Price-List.

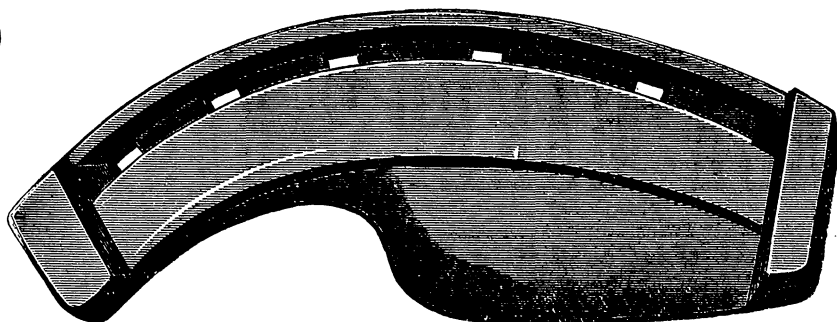
J. BARDSLEY, 149 & 151 Baxter St. New York.

SCRANTON FORGING CO.,

SCRANTON, PA.

CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

FORGED
OX
SHOES.



Made under Deeble's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.

BURDEN'S HORSE SHOES.

"Burden Best"

Iron
Boiler Rivets.

The Burden Iron Co.

TROY, N. Y.

Standard Horse Shoe Co.,

Manufacturers of

HORSE AND MULE SHOES.

LEEDS, ROBINSON & CO., General Agents,

75 North Street, Boston, Mass.

Crescent

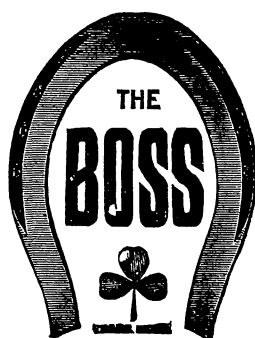
Horse and Mule Shoes,

BAR IRON.

CRESCENT HORSE SHOE

IRON CO.,

Max Meadows, Va.



HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,
CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,

MANUFACTURERS OF

Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.

Works at Valley Falls, R. I.

Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres.,

C. H. PERKINS, Gen. Manager,

R. W. COMSTOCK, Sec'y,

CHARLES R. STARK, Treas.

J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.

THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

DIAMOND STATE IRON CO.

WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blank Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

PHILADELPHIA OFFICE,
206 So. Fourth St.

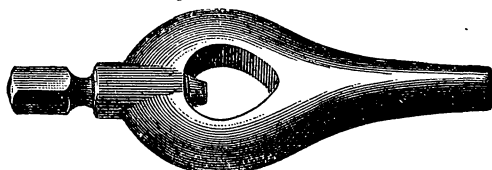
{ Correspondence invited }

NEW YORK OFFICE
11 Pine St.

LE COUNT'S STRAIGHT TAIL DOG, WITH STEEL SCREWS.

U. S. Standard, and the points hardened. To be driven from a stud in the face plate.

It is from the same pattern as the Heavy Steel Dog, and warranted, like that, not to break with any work.



No.	Inch.	Price.	No.	Inch.	Price.
1.....	3/4	\$0 60	11.....	3 1/2	\$1 45
2.....	1	70	12.....	4	1 60
3.....	1 1/4	70	13.....	4 1/2	1 80
4.....	1 1/2	80	14.....	5	2 10
5.....	1 3/4	80	15.....	5 1/2	2 75
6.....	2	85	16.....	6	3 25
7.....	2 1/4	95	17.....	6 1/2	4 00
8.....	2 1/2	1 10	18.....	7	5 00
9.....	2 3/4	1 20	19.....	7 1/2	6 00
10.....	3	1 35	20.....	8	7 00

One set to 2 inch, \$7.80. Full set, \$44.10

This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

C. W. LE COUNT, MANUFACTURER, SO. NORWALK, CONN., U. S. A.
These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St London, England.

H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents. New York.



Elegant Iron.

Beautiful Shape.

HORSE SHOES,
Light, Medium and Heavy.

MULE SHOES,
Light, Medium and Heavy.

Illustrated booklet and prices to all
parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,

ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.

Richmond, Va., U. S. A.

McKINNON DASH & HDW. CO.,

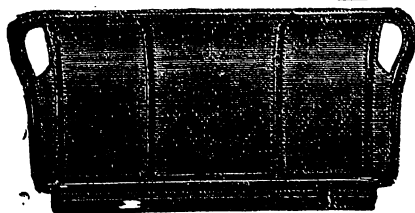
LIMITED, Manufacturers of

FINE QUALITY

DASHES

AND


FENDERS,



C. PATTERN.

SURREY DASH.

BUFFALO, - N. Y.



P. F. BURKE, Successor to
C. F. DEWICK & CO.
Manufacturer of
PATENT STEEL
(Blunt and Sharp)
TOE-CALKS.
—ALSO—
BURKE'S IMPROVED
HORSESHOERS'
FOOT VICE.
Send for Circulars.
360 Dorchester Av. Die for Welding
BOSTON, MASS. Sharp Calks.

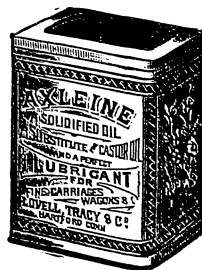
PHOENIX HORSE SHOES.

PHOENIX HORSE SHOE CO.,

Poughkeepsie, N. Y.

NEW YORK OFFICE, No. 66 Reade St.

AXLEINE



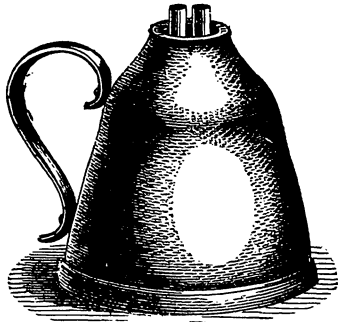
is a fine quality of Axle Grease put up in square tin boxes containing one pound; beautifully decorated in assorted colors; designed especially for the Hardware Trade. Showy and attractive shelf goods.

Send for sample and prices.

LOVELL, TRACY & CO. 71 Asylum St.,
Hartford, Conn.

BUFFALO SCALE CO., Buffalo, N. Y. SCALES OF ALL KINDS.

PATENTED ARTICLES
OF
Malleable Iron.
Hammer's Malleable Iron Hand Lamps.



SCREW, KEROSENE SIZE.

Hammer's Adjustable Clamps.
Hammer's Malleable Iron Oilers, 3 Sizes
Hammer's M. I. Hanging Lamps.

NEW pattern Heavy Screw Clamps
strongest in the Market.

For sale by all the principal Hardware Dealers.

Send for Price List.

MALLEABLE IRON CASTINGS

Of superior quality, and Hardware Specialties
in Malleable Iron made to order.

HAMMER & CO.,
BRANFORD, CONN.

HOWARD IRON WORKS,

BUFFALO, N. Y.,

Manufacturers of

BOLT CUTTERS

AND NUT TAPPING MACHINES,

(Schlenker's Patent),

Send for Illustrated Catalogue.



BERGER'S PATENT TRUCKS.

The Handiest, Cheapest and
best in existence.

Highest testimonials from those in
use. Wholesale agents wanted in every
city. Correspondence from Truck Man-
ufacturers solicited. Circulars, price-
lists and full particulars furnished.

BERGER BROS.,

237 Arch St., Philadelphia, Pa



This Wrench can be Furnished with Long
Nut or Sleeve.

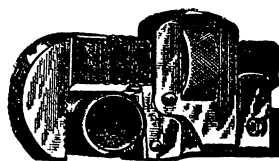
COMBINATION WRENCH.

Case-Hardened Throughout.

Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the
requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.
For Circulars and Price-List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A.



TRIMO PIPE WRENCH,

Forged Steel.

All parts Interchangeable.

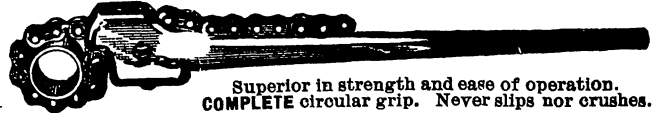
Grips firmly without loss of motion. Releases readily. Never locks. Causes no
trouble in close quarters. Does not crush the pipe.

TRIMO

CHAIN

PIPE

WRENCH.



Superior in strength and ease of operation.
COMPLETE circular grip. Never slips nor crushes.



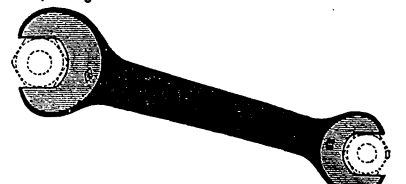
TRIMO

BASIN WRENCH.

TRIMONT MFG. CO., ROXBURY,
MASS.

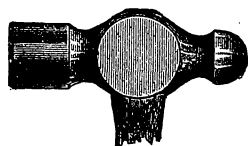
SINGLE AND DOUBLE HEAD WRENCHES.

Furnished Finished or Unfinished. Drop-Forged from Steel.



The finished wrenches are milled to fit U. S. Standard finished Nuts and are polished and
case-hardened. In stock for all sizes bolts from 1/8 inch to 2 1/4 inches inclusive.

J. H. WILLIAMS & CO., 9-15 RICHARDS ST.,
BROOKLYN, N. Y.
Iron, Steel, Copper and Bronze Drop-Forgings.



**BILLINGS' BALL PENE
MACHINIST'S HAMMER.**

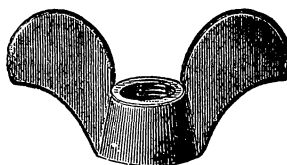
DROP FORGED FROM BEST TOOL STEEL.

SUPERIOR TO ALL OTHERS IN DESIGN,

MATERIAL, TEMPER AND FINISH.

THE BILLINGS & SPENCER CO.

HARTFORD, CONN.



WE CARRY A FULL LINE OF
THREADED THUMB SCREWS AND NUTS
IN STOCK.

Prices quoted on application to

THE FRASSE CO.,
19 Warren St., New York.

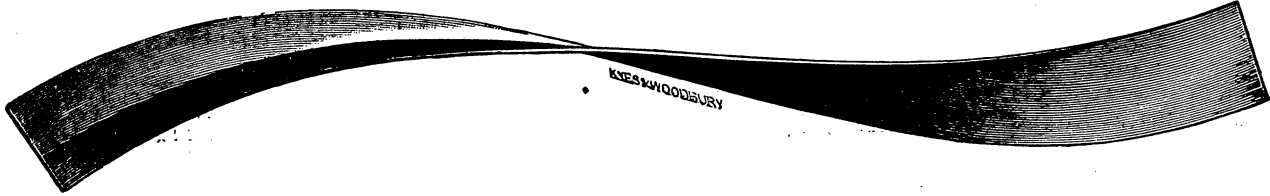
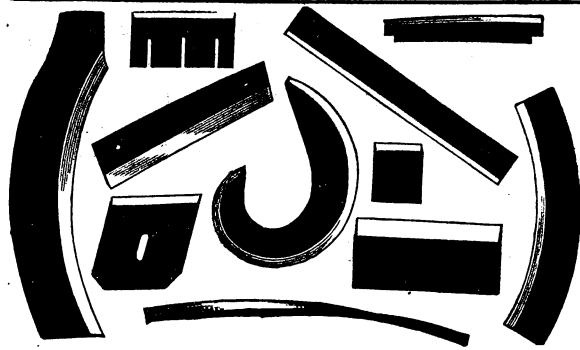
LORING COES & CO.

WORCESTER, MASS.

Manufacturers of **MACHINE KNIVES.**

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades Etc., showing how the Steel is laid.

**THE IMPROVED ACME STEEL WRENCH**

PATENTED.

CAPITOL MFG. CO.,

Cable Address: "CAPITOL, CHICAGO."

125 to 137 REES STREET,
CHICAGO, ILL., U. S. A.

Awarded Prize Medal at Paris Exposition and Jamaica Exposition

ACME.
Standard Bright
Finish.HERCULES.
Combination Pipe Bolt and
Nut Wrench. Bright Finish.

The Hercules Screw Driver and Tack Claw (Patented).

This Screw Driver is made from one piece of special cast steel, in all sizes, from 1 1/4 in. to 12 in. The blade is well polished, carefully tempered, and every screw driver is subjected to a severe test and warranted. Handles Japaned with the best quality baking Japan.

The Strongest and Most Durable Wrench and Screw Driver Made.
Write for Prices and Full Information.

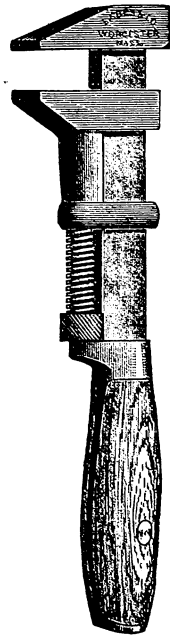
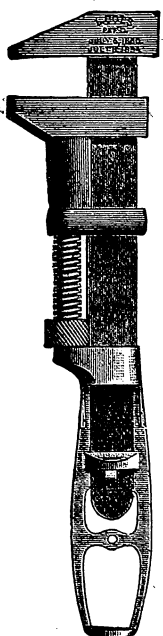
HARMON & DIXON, 118 Chambers St., New York, N. Y., Eastern and Export Agents.

L. COES'Genuine Improved
KNIFE HANDLE
PATENT**Screw
Wrenches**

MANUFACTURED BY

COES WRENCH CO.,

WORCESTER, MASS.

Established in
1839.Registered
March 31, 1874.Patented July
6, 1880.Patented July
8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

Straight Bar, Extra Long Nut for Screw in Jaw.

The **BEST MADE** and **STRONGEST WRENCH** in the MARKETJ. C. McCARTY & CO.,
JOHN H. GRAHAM & CO } New York Agents.

IMPROVED MINE LAMP.
FOR ANTHRACITE AND
BITUMINOUS
MINING
6
DIFFERENT
STYLES
OF SPOUTS.
SAMPLE 15¢.

SEAMLESS
BRASS
COLLAR
BRASS HINGE
Lid Solid
NO SOLDERING

B. E. LEONARD, Scranton, Pa.

PATENT AIR TUBE MINE LAMP.
FIVE DIFFERENT
SIZED
SPOUTS
SEND
15 CENTS
FOR SAMPLE
TO SAMPLE

SEAMLESS
BRASS
COLLAR
BRASS HINGE
Solid Lid
NO SOLDERING
HINGE
CANNOT
MELT OFF.

T. F. LEONARD - Scranton, Pa.

Law without Lawyers.

A Compendium of Business
and Domestic Law for
Popular Use.

By **H. B. COREY,**

Member of the New York Bar,

PRICE, \$1.00. Post-paid.

A simple, clear and accurate presentation of the general laws, and of the laws of the several States relating to the rights of property, contracts, debts, partnerships, bankruptcy, insurance, corporations, marriage, divorce, &c., &c., with which are included correct copies of all legal instruments and forms, such as notes, deeds, mortgages, leases, wills, &c., and a dictionary of legal words and phrases.

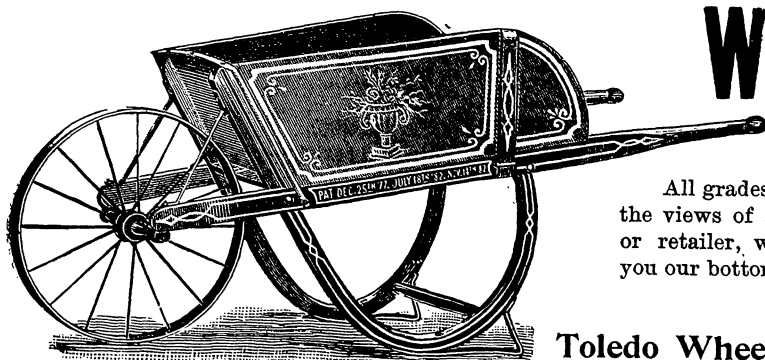
Sent, post-paid, on receipt of price by

DAVID WILLIAMS, Publisher & Bookseller.

96-102 Reade Street, New York.

UNFORESEEN was the present condition of affairs a few months ago. We are, however, still prepared to make any reasonable inducement to purchasers needing our goods, such as Drag and Wheel Scrapers, Wheelbarrows (all kinds, Steel Sinks), Etc. We make the finest and largest line in the world.

THE KILBOURNE & JACOBS MFG. CO., Columbus, O., U. S. A.

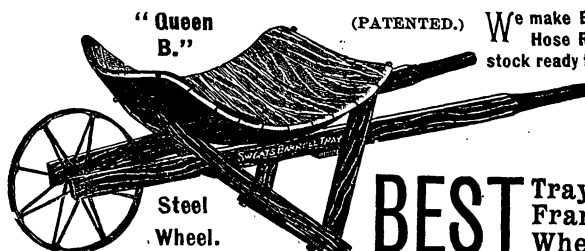


WHEELBARROWS.

All grades, all styles, all sizes, at prices that will meet the views of any hardware dealer in the country. Jobber, or retailer, write us your requirements and we will name you our bottom prices.

Toledo Wheelbarrow Works, = Toledo, Ohio.

"BARREL TRAY"
WHEEL BARROWS
ARE THE BEST ON EARTH.



"Queen B."

(PATENTED.)

We make Barrows of every description, Factory Trucks, Hose Reels, Mortar and Brick Hods, and carry large stock ready for shipping.

Get our prices and we will get your order.

SWEATT MFG. CO.,
Minneapolis, Minn.

J. C. McCARTY & CO., New York, Direct Representatives.
G. A. SEAEVER, New Orleans, Special Agent.

BEST Tray Frame Wheel.



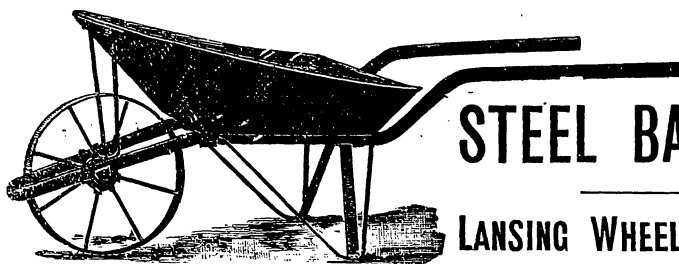
Boss Sprinkler.

For Potatoes, Tobacco, Cotton and all small Plants and Vines.

Has given satisfaction to all who have handled it.

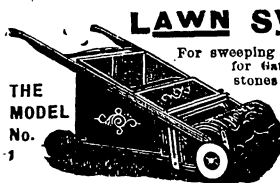
Prices and Circulars sent on application.

OLIVER A. SMITH,
CLARKSTON, MICH.



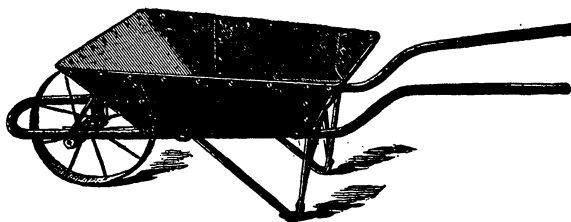
STEEL BARROWS.

LANSING WHEELBARROW CO.
LANSING, MICH.



LAWN SWEEPERS.

For sweeping Lawns after mowing, for gathering Leaves, sticks, stones and litter. Used in Parks, Cemeteries, Tennis Courts and all public and private grounds. Two sizes. **LAWN ROLLERS.** For keeping lawns and terraces smooth and compact. Used when frost is leaving ground and after rain for re-sodding and laying out yards and flower gardens. Write for full description and prices. **THOMPSON MFG CO.** D. N. WEAVER, Sec'y. ELKHART, INDIANA.



Re-enforced Tray, Strong and Durable.

Also McNeil's Patent Balanced Charging Barrows, Automatic Dump.

Write us for Prices.

THE AKRON TOOL CO., AKRON, O.

ALL STEEL WHEELBARROWS & SCRAPERS



Write for Catalogue

MANUFACTURED BY

AMERICAN STEEL SCRAPER CO.,
1104 Court Street, SIDNEY, O.





"A Small Cut,"

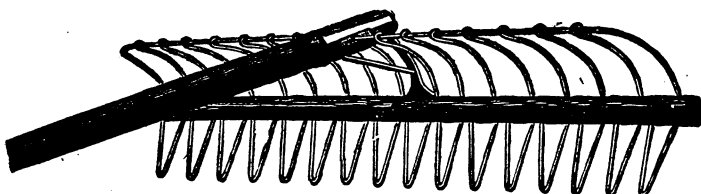
But not in prices. Our productions don't need that sort of "Boosting," they speak for themselves. If you need Wooden Barrows, Iron Barrows, Drag and Road Scrapers, or a Barrow for any purpose, *we are makers*, and first-class, too, don't forget that.

Sidney Steel Scraper Co., 924 Poplar St., Sidney, Ohio, U. S. A.

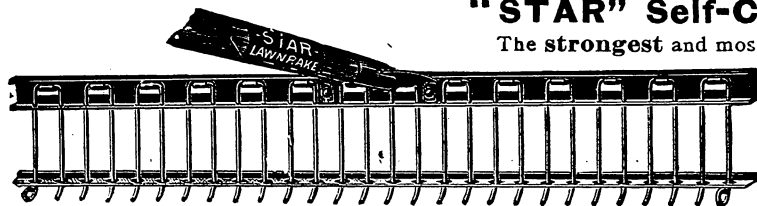
LAWN RAKES. The "GEM" AND "DAVIS."

Both good and each the best. If you have not stocked up, better do so at once. Our prices are low.

SCHAEFFER & CO., Dayton, O.



"STAR" Self-Cleaning Lawn Rakes. All Steel.

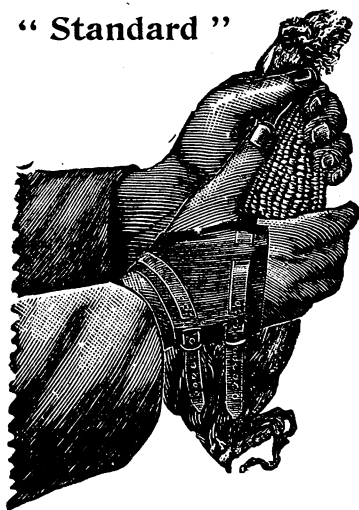


"STAR" Self-Cleaning Lawn Rake.
Pat. Feb. 21, 1893.

The strongest and most practical rakes in the market. The cleaning bar keeps the teeth free from leaves and grass and the eyes on the end teeth prevent the other teeth from digging in the ground. We also make "STAR" Lawn Rakes as above without the self-cleaning bars and turned up end teeth.

SYRACUSE SPECIALTY MFG. CO., Syracuse, N. Y., U. S. A.
SURPLESS, DUNN & ALDER, 97 Chambers St., New York,
DIRECT REPRESENTATIVES.

The
"Standard"



Corn Husker

Easier to use, does more work, can be used in any manner, doesn't interfere with tying fodder. Guaranteed the cheapest practical Husker made. Write,

Moore & Wickert, Mfrs.,
GREEN SPRING, OHIO.

Beats
Them All.



HALL'S HUSKERS

MADE BY

HALL & ROSS HUSKING GLOVE CO.,
CHICAGO, ILL.,



Are guaranteed to be the Best, and in Competition sell in preference to all others.

See that our trade-mark is on every pin.

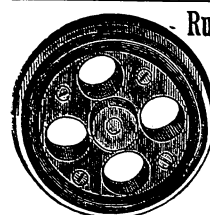
The Cockburn Barrow and Machine Co.

OFFICE AND WORKS:

234 to 240 Eleventh St., JERSEY CITY, N. J.

NEW CONCRETE MIXING MACHINES.

Coal and Ash Buckets, Coaling Tubs, Coal and Coke Cars, Patent Tubular Frame Wheelbarrows, Furnace Charging Barrows and Cars, Sheet Iron Work of every description, Patent Power Punching Machines, Every Description of General Forgings, Dimpfel Blowers Machine Work



Rubber and Iron Wheels

Casters for Trucks,
Baskets and Boxes
Heavy Casters for
Mill use.
Catalogues free.
H. P. CLARK, Box 0,
Windsor Locks, Conn.

PENNSYLVANIA.

New Quaker City

INVITATION.

We cordially invite our friends and customers to visit our Exhibit at World's Fair, Chicago, where will be seen the finest and most complete line of Lawn Mowers ever put on the market.

REMEMBER THE LOCATION:

Horticultural Building, North Wing, Section F, Column 73.

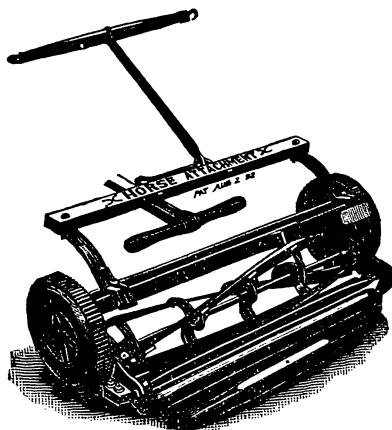
SUPPLEE HARDWARE CO.,
PHILADELPHIA.

Great American.

CONTINENTAL.

THE "CHIEF" MOWER

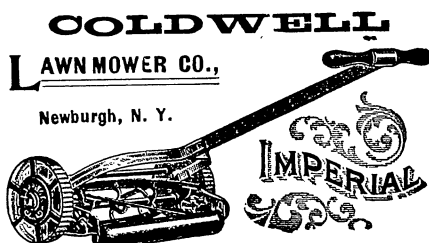
With Horse Attachment.



TEN INCH TRACTION WHEEL. EXCELS FOR FINE QUALITY OF MATERIAL AND FINISH. SIMPLE ADJUSTMENTS, SMOOTH CUTTING.
THE ONLY FIRST-CLASS COMBINATION MOWER ON THE MARKET. PRICES LOW, TERMS REASONABLE.

Mfd. by **CHAMPION MFG. CO.,**LAWN MOWERS,
RAKES, Etc.,

257 Ft. Wayne Ave., Richmond, Ind.



COLDWELL
LAWN MOWER CO.,
Newburgh, N. Y.

THE BEST MOWER
ON THE MARKET.

SEND FOR OUR PAPER

"THE LAWN,"

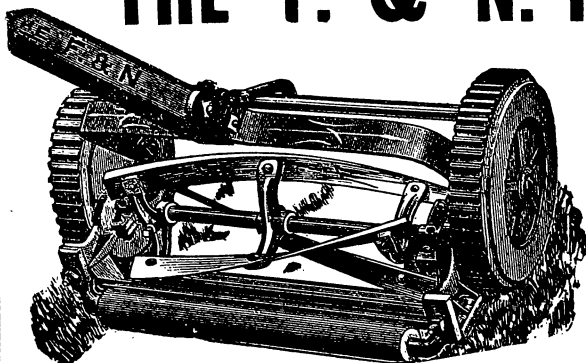
IT IS FULL OF INFORMATION ABOUT LAWNS AND
LAWN MOWERS.

THE F. & N. MFG. CO.,

Manufacturers of

Lawn Mowers, Lawn
Sweepersand Grass Catchers,
RICHMOND, IND., U.S.A.The F. & N. High Grade Lawn
Mower. Fully Guaranteed.

AGENTS

Woodrough & Hanchett Co.,
Chicago, Ill.
C. F. Guyon Co., Ltd., New York.
Woodrough, Mansfield & Co.,
Boston, Mass.

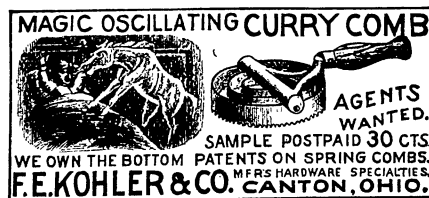
NEEDED IN EVERY HOUSE.

**GEM VEGETABLE
MASHER.**

SAMPLE POSTPAID 30 CTS.

AGENTS WANTED.

F.E. KOHLER & CO. CANTON, OHIO.



MAGIC OSCILLATING CURRY COMB

AGENTS
WANTED.

SAMPLE POSTPAID 30 CTS.

WE OWN THE BOTTOM PATENTS ON SPRING COMBS.
F.E. KOHLER & CO. CANTON, OHIO.

HENLEY'S LAWN MOWERS

First-class high grade machines,
made of the best materials. Neat,
symmetrical, strong, dura-
ble and unexcelled in con-
struction and ease of oper-
ation. Does perfect work.
For prices address

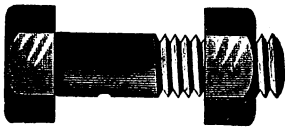
**M. C. HENLEY, Sole Mfr., Richmond, Ind., U. S. A.**

GARPENTER & BAYLES, Eastern Agents, 91 Chambers St. & 73 Reade St., New York City.

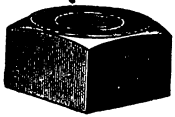


WROUGHT WASHERS

Every Washer.
FLAT
With hole in
TRUE CENTER.



MACHINE BOLTS.



HOT PRESSED NUTS.

Highest
Standard of
EXCELLENCE.

Packed in kegs for general trade, or in 1 and 5 lb. boxes for hardware trade.

It will pay you to correspond with us.

MILTON MANUFACTURING CO.,

MILTON, PA.

SOMETHING NEW.

A strictly high grade LAWN MOWER at the price of a cheap one, owing to a radical change in design and construction in the present style of machine.

— A GREAT HIT. —

Circulars soon ready.

W. E. LAPE, Syracuse, N. Y.

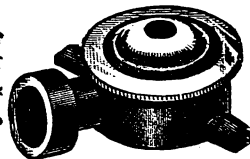


Japanese No. 12, Adjust.

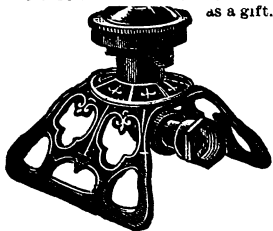
LAWN SPRINKLERS

Patent No. 9.

We manufacture the BEST and CHEAPEST Lawn Sprinklers in the World.



The only Sprinklers which have no revolving parts to leak or wear out.
The only Sprinklers free from small holes, and which cannot become clogged with gritty substances.
The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or as heavy as the area of the supply pipe.
The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with low pressures.
We also manufacture the old style revolving sprinklers, but for our own use would not have them as a gift.

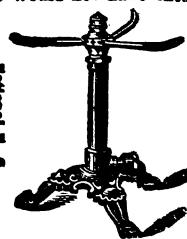


Patent No. 8.

ETTE & HENGER MFG. CO.

ST. LOUIS MO.

SEND FOR DESCRIPTIVE CIRCULARS.



Patent No. 8.

HAY KNIVES

SEASON OF 1892-93.

"LIGHTNING"

(Reg. Trade-Mark No. 9583.)

"BLIZZARD"

Reg. Trade-Mark No. 19,390.

It pays to handle
FIRST
CLASS
goods.



Write us early
for prices and
terms.

Sole Manufacturers,
The HIRAM HOLT COMPANY
EAST WILTON, MAINE.

Chadborn & Coldwell Mfg. Co.,

NEWBURGH, N. Y.,
Sole Manufacturers of



New Model
AND
Excelsior
LAWN
MOWERS,
ALSO
The Rival,
The O K,
Etc., Etc.

Send for Illustrated Catalogue.

AMERICAN BOLT COMPANY,

Manufacturers of

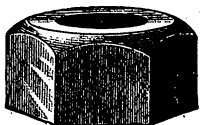
BOLTS AND NUTS, COACH OR LAG SCREWS

Bridge Bolts, Car Bolts, Track Bolts, Washers, Chain Links, BUILDING BOLTS
AND IRONS OF ALL KINDS, Forgings, Bolt and Nut Machinery, &c.

JAMES MINTER, President.

LOWELL, MASS.

MILES F. BRENNAN, Treas.



PORTCHESTER BOLT & NUT CO.

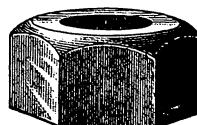
Port Chester N. Y.

MANUFACTURERS OF

BOLTS, NUTS, RIVETS and WASHERS

CHAMFERED AND TRIMMED.

SQUARE AND HEXAGON NUTS A SPECIALTY.



American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet
Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

WM. H. HASSELL, PRESIDENT.

E. S. MASON, TREASURER.

D. A. HUNT, AGENT.

WM. H. HASSELL CO.,

—MANUFACTURERS OF—

GIMLET POINT COACH SCREWS

Bolts, Cold-Punched Nuts and Washers,
SUITABLE FOR MACHINERY OF ALL KINDS.

Office and Works: 451 Main St., PAWTUCKET, R. I., U. S. A.

HENRY B. NEWHALL CO., Agents,

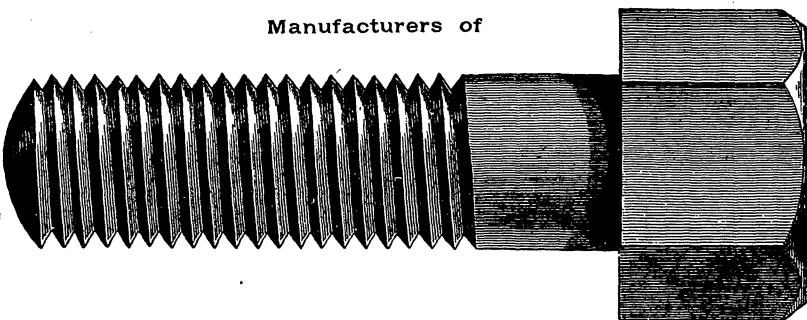
105 CHAMBERS STREET, NEW YORK.

- 47 PEARL STREET, BOSTON.

WORCESTER MACHINE SCREW CO., Worcester, Mass.

Manufacturers of

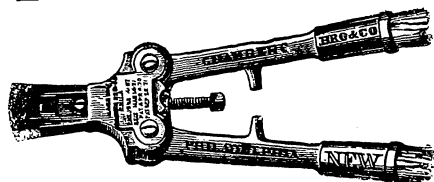
**SET,
CAP AND
MACHINE
SCREWS.**



**STUDS FOR
STEAM
ENGINE,
PUMPS, &c.**

EXPANSION BOLTS.

For Fastening all Kinds of Structure to Brick and Stone Work.
Patentee and Mfr., **ISAAC CHURCH,**
Toledo, O.
Send for Catalogue.

**BOLT & RIVET CLIPPERS,**

For cutting off the ends of Bolts and Rivets.
Liberal discounts to the trade.

CHAMBERS BROTHERS COMPANY

52d St., BELOW LANCASTER AVE.,
PHILADELPHIA, PA.

WM. H. JACOBUS,

No. 90 Chambers St., New York.

New York Office of

J. F. Wollensak.
Barnes Mfg. Co.
Penn Lock Works.
Lorenz Bommer.
Palmer Hdw. Mfg. Co.
Dibble Mfg. Co.
Wire Goods Co.
Garritt & Beach.
Prindle Mfg. Co.
Tuck Mfg. Co.
Henis Vegetable Press.
Dille & McGuire Mfg. Co.
National Rivet Works.
Lufkin Rule Co.
Wolcott Hdw. Co.
Zimmerman's Blind Adjusters.
Burnside Cedar Faucets.
Fibre Head Mallet.
Glazier's Patent Hooks.

RIVETS
OF EVERY DESCRIPTION, FIRST QUALITY.

W.P. TOWNSEND & CO.

NEW BRIGHTON, PA.

Illustrations of various rivet types: ROUND HEAD, FLAT HEAD, CONE HEAD, ROSE HEAD, STEEPLE HEAD, COUNTERSUNK HEAD, WAGON BOX HEAD, BELT RIVET, TRUSS HEAD.

5/16, 6/16, 7/16, 8/16, 10/16, 12/16

ESTABLISHED 1865.

J. H. Sternbergh & Son,

READING PA.

BOLTS, NUTS, WASHERS, RIVETS,

Including Machine Bolts, Carriage Bolts, Bridge Bolts and Car Bolts,
THE HARVEY PATENT GRIP-THREAD TRACK BOLT, Soft Steel Bolts with Cold Rolled Thread, Bolt Ends, Turnbuckles, Sleeve Nuts, Lag Screws, Set Screws and Tap Bolts and every variety of screwed work.
BOILER, BRIDGE AND SHIP RIVETS, Square and Hexagon Nuts of all kinds and sizes, Plate Washers, Belt Lacing Machines, Rods and Irons for Bridges and Buildings, Merchant Bar Iron, etc., etc.
Branch Establishment, **THE KANSAS CITY BOLT & NUT CO.,** Kansas City, Mo.



J. FRED WILSON, Worcester, Mass.

Metal Punching AND Die Work.

Cold Punched Nuts and Washers
for all Purposes.

SEND FOR PRICES ON
SPECIALTIES IN LINE OF PRESS WORK.

CLASSIFIED LIST OF ADVERTISERS.

Advertisement Writer.
Duffy, J. A., Hannibal, Mo.

Air Chambers, Copper.
Emory, F. P. Mfg. Co., Springfield, Mass.
Springfield Brass Co., Springfield, Mass.

Air Compressors.
Norwalk Iron Works, S. Norwalk.
Rand Drill Co., 23 Park Place, N. Y.

Air Moving Machinery.
Howard & Morse, 45 Fulton, N. Y.

Aluminum.
Illinois Pure Aluminum Co. Lemont, Ill.
Pittsburgh Reduction Co. Pittsburgh.
Scovill Mfg. Co., Waterbury, Conn.

Aluminum, Brass and Bronze.
Gaylord, F. L. Co., Ansonia, Conn.
Haigh & Clark, Albany, N. Y.
St. Louis Bronze & Aluminum Works, St. Louis, Mo.

Analytical Chemists.
Erlinton, J. Blodgett, Philadelphia, Pa.
Hunt, Robt. W. & Co., Chicago, Ill.
Moore, Dr. Gideon E., 221 Pearl St., N. Y.

Anti-Friction Metals.—See Babbitt Metal.

Anvil and Vise (Combination).
Fulton Iron & Engine Works, Detroit, Mich.

Anvils.
Eagle Anvil Works, Trenton N. J.
Wright, Peter & Sons, Dudley, Eng.

Apple Parers.
Goodell Co., Antrim, N. H.

Appraisers, Auctioneers, &c.
Loring, Chas. Carroll & Co., Boston, Mass.

Arms and Ammunition.
Forehand Arms Co., Worcester, Mass.
Harrington & Richardson Arms Co., Worcester, Mass.
Hartley & Graham, 313 & 315 Broadway, New York.

Arms, J. Arms and Tool Co. Chicopee Falls, Mass.
Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.

Auctioneers.
Bissell, E. Son & Co., N. Y.

Axes.
Peck, A. G. & Co., Cohoes, N. Y.
Warren Axe & Tool Wks., Warren, Pa.

Axe Wedges.
Wooster, F. V., Boston, Mass.

Axie Grease.
Lovell, Tracy & Co., Hartford, Conn.

Axles, Springs, &c.—Manufacturers of.
Gaudier Steel Dept. of Cambria Iron Co., Johnstown, Pa.
Wurster, F. W. & Co., Brooklyn, N. Y.

Babbitt Metal.
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.
Crown Smelting Co., Chester, Pa.
Hertz, T. & Son, St. Louis, Mo.
Keys, W. W. & R. M. Co., Bridgeport, Conn.
Reeves, Paul S., Philadelphia, Pa.

Bakers and Roasters.
Bronson Supply Co., Cleveland, Ohio.

Bale Ties.
Kilmer Mfg. Co., Newburg, N. Y.

Band Saw Machines.
Cross & Spers Machine Co., Waterbury, Conn.

Barb Wire and Fence.
Consolidated Steel & Wire Co. St. Louis, Mo.
Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.

Barbed Wire.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Washburn & Moen Mfg. Co., Worcester, Mass.

Bar Iron, Manufacturers of.
Atma-Standard Iron & Steel Co., Bridgeport, Conn.
Allentown Rolling Mill, Allentown, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.

Bar Iron and Steel Co., Danville, Pa.
Mahoning Valley Iron Co., Youngstown, Ohio.
Sternbergh, J. H. & Son, Reading, Pa.

Barrel Swings.
Leavitt Machine Co., Orange, Mass.

Bellows, Manufacturers of.
Bullock Bellows Co., Cleveland, O.
Scott, Geo. M., Chicago, Ill.

Bells.
Bevin Bros. Mfg. Co., East Hampton.

Belt Dressing.
Jos. Dixon Crucible Co., Jersey City, N. J.

Belt Fasteners.
Bristols' Mfg. Co., Waterbury, Conn.
Claffen Mfg. Co., Cleveland, Ohio.
Talcott, W. O., Providence, R. I.

Belted, Makers of.
Alexander Bros., 412 N. 3d, Phila.
Jenny Mfg. Co., Columbus, O.
Link-Belt Engineering Co., Phila., Pa.
Main Belting Co., Philadelphia, Pa.
N. Y. Belting & Packing Co., Ltd., N. Y.
Roberts Mfg. Co., Pittsburgh, Pa.
Shultz Belting Co., St. Louis, Mo.

Bicycles.
Bingham, W. Co., Cleveland, Ohio.
Hulbert Bros. & Co., 36 W. 23d St., N. Y.
Indiana Bicyc. Co., Indianapolis, Ind.
Lovell, Jno. P. Arms Co., Boston, Mass.

Pope Mfg. Co., Boston, Mass.
Read, Wm. & Sons, Boston, Mass.
Rouse, Hazard & Co., Peoria, Ill.
Toledo Bicycle Co., Toledo, O.
Western Wheel Works, Chicago, Ill.

Bits and Braces.
Bridgeport Gun Implement Co., 312-315 Broadway, N. Y.

Blocks, Tackle, Makers of.
Cleveland Block Co., Cleveland, O.
Fulton Iron & Engine Works, Detroit, Mich.
Shoert & Cottingham, Philadelphia, Pa.
Toledo Block Works, Toledo, O.

Blowers.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Huyett & Smith Mfg. Co., Detroit, Mich.
Sturtevant, B. F. & Co., Boston, Mass.

Boiler Plates.
Cannon Steel Co., Pittsburgh, Pa.
Mollvain, Wm. & Sons, Heading, Pa.
Lukens Iron & Steel Co., Coatsville, O.
Pottstown Iron Co., Pottstown, Pa.

Bollers, Copper.
Randolph & Clowes, Waterbury, Conn.

Bollers, Steam.
Babcock & Wilcox Co., 30 Cortlandt, Edge Moor Iron Co., Wilmington.
Fulton Steam Boiler Works and Fdry., Richmond, Ind.
Harrison Safety Boiler Wks., Phila., Pa.
Phoenix Iron Works Co., Meadville, Pa.
Pollock, W. B. & Co., Youngstown, O.
Southwick Fdry. & Mch. Co., Phila., Pa.
Wetherill, Robt. & Co., Chester, Pa.

Bolt Cutters.
Chambers Bros. Co., Philadelphia.
Howard Iron Works, Buffalo, N. Y.
Porter, H. K., Boston, Mass.
Reece, Edw. F., Greenfield, Mass.
Wells Bros. Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

Books.
Marine Review, Cleveland, Ohio.
Williams, David, 96-102 Beade, N. Y.
Wolcott & West, Syracuse, N. Y.

Boring Machines.
Buckeye Mfg. Co., Union City, Ind.

Box Bender.
Goodell, J. W., Burlington, Vt.

Boxes, Hdw. Shelf, &c.
Green, A. H., 22 Park Place, N. Y.
Jones, Jesse & Co., Philadelphia, Pa.

Box Straps and Corners.
Buffalo Specialty Mfg. Co., Buffalo, N. Y.

Brackets.
Atlas Mfg. Co., New Haven, Conn.

Brake Shoes.
Sargent Co., Chicago, Ill.

Brass, Manufacturers of.
Ansonia Brass & Copper Co., N. Y.
David, John & Sons, 100 John, N. Y.
Holmes, Booth & Haydens, N. Y.
Plume & Atwood Mfg. Co., N. Y.
Randolph & Clowes, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Waterbury Brass Co., 296 B'way, N. Y.

Brass Butt Hinges.
Tiebout, W. & J., 16 & 18 Chambers.

Brass Founders.
Best, Fox & Co., Pittsburgh, Pa.
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.
Crane, Wm. & Sons, 3 & E. B. Co., Philadelphia, Pa.

Emory, P. P. Mfg. Co., Springfield, Mass.
Haigh & Clark, Albany, N. Y.
Keys, W. W. & R. M. Co., Bridgeport, Conn.
Neys Bros. Mfg. Co., Phila., Pa.
Reeves, Paul S., Philadelphia.

Brass Goods.
Brass Goods Mfg. Co., 88 Chambers.

Bridge Builders.
Berlin Iron Bridge Co., East Berlin, Ct.
Boston Bridge Works, Boston, Mass.
Wrought Iron Bridge Co., Canton, O.

Bronze (Tobin).
Ansonia Brass & Copper Co., 19-26 Cliff Street, N. Y.

Brooms and Brushes.
Lay, Jos. & Co., Ridgeville, Ind.

Builders' Hardware.
Deitz, A. E., 97 Chambers St., N. Y.
Reading Hdw. Co., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.

Butchers' Steel.
Chaffin, John & Sons, 85-89 Cliff St., N. Y.

Hoffman, C. & A., Philadelphia, Pa.

Butcher and Shoe Knives, Manufacturers of.
Chaffin, John & Sons, 85-89 Cliff St., N. Y.
Goodell Co., Antrim, N. H.
Wilson, John, Sheffield, England.

Buts and Hinges.
McKinney Mfg. Co., Alleghany, Pa.
Sabin Machine Co., Montpelier, Vt.
Stanley Works, New Britain, Conn.
Tiebout, W. & J., 16 Chambers, N. Y.

Cateters and Dividers.
J. Stevens Arms and Tool Co., Chicopee Falls, Mass.
Starrett, S. B., Andol Mass.
Cabinet Makers' Benches.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

Car Axles.
Roberts, A. & P. & Co., Phila.

Carboy Stands.
Hillebrand & Wolf, Philadelphia, Pa.

Car Wheels.
Whitney, A. & Sons, Phila.

Carriage Hardware, Makers of.
Covert's Saddlery Works, Farmer, N. Y.
Eccles, Richard, Auburn, N. Y.
McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.
Scranton Forging Co., Scranton, Pa.
Smith, H. D. & Co., Plantsville, Conn.
Wilcox & Howe Co., Birmingham, Conn.

Cartridge Reloading Tools.
Ideal Mfg. Co., New Haven, Conn.

Casters, Wheel, &c.
Clark, G. F., Windsor Locks, Conn.

Castings, Iron and Steel.
Ames Sword Co., Chicopee, Mass.
Arcade Malleable Iron Co., Worcester, Mass.
Aechman Steel Casting Co., Thurlow, Pa.

Booth, The Lloyd Co., Youngstown, O.
Burgess & Loxley, Buffalo, N. Y.
The Burr & Houston Co., Brooklyn, N. Y.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Cheney, S. & Son, Manlius, N. Y.
Chester Steel Casting Co., Phila.
Chrome Steel Works, Brooklyn, N. Y.
Dayton Malleable Iron Co., Dayton, O.
Ette & Henger Mfg. Co., St. Louis, Mo.
Eureka Cast Steel Co., Chester, Pa.
Flagg, Stanley G. & Co., Phila.

Garland Foundry Co., Cleveland, O.
Haigh & Clark, Albany, N. Y.
Hammer & Co., Branford, Conn.
Herrick, J. A., 284 Pearl St., N. Y.
Johnson Foundry Co., Johnstown, Pa.
Johnson, I. G. & Co., Spuyten Duyvil, N. Y.
Mahoning Fdry. & Mch. Co., Danville, Pa.
Northwest Malleable Iron Co., Milwaukee, Wis.

Palmer & De Mooy, Cleveland, O.
Passaic Art Casting Co., Passaic, N. J.
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.

Peerless Fdry Co., Philadelphia, Pa.
Sargent Co., Chicago, Ill.
Sessions Foundry Co., Bristol, Conn.
Shilling Fdry. Co., Columbus, O.
Spencer's, I. S., Sons, Guilford, Conn.
Standard Fdry. & Mfg. Co., Cleveland, O.
Standard Steel Casting Co., Thurlow, Pa.

Taylor Iron & Steel Co., High Bridge, N. J.
Teiken & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.
Trenton Mal. Iron Co., Trenton, N. J.
Union Mfg. Co., 103 Chambers St., N. Y.
West Coxsackie Iron Fdry. Coxsackie, N. Y.
Wetherill, Robt. & Co., Chester, Pa.

Chains.
Bradlee & Co., Philadelphia.
Bridgeport Chain Co., Bridgeport, Conn.
Link-Belt Engineering Co., Phila., Pa.
McKay, Jas. & Co., Pittsburgh, Pa.

Chimneys.
Phila. Engineering Works, Phila., Pa.

Chisels, Manufacturers of.
Buck Bros., Millbury, Mass.
White, L. & I. J. Co., Buffalo, N. Y.

Chucks.
Cushman Chuck Co., Hartford, Conn.
Hogson & Pettis Mfg. Co., New Haven, Conn.
Smith & Egge Mfg. Co., Bridgeport.

Skinner Chuck Co., New Britain, Conn.
Union Mfg. Co., 103 Chambers, N. Y.
Whitlock, W. 132d St. & Park Ave., N. Y.
Whitton, D. & Mach. Co., New London, Conn.

Churns.
Buckeye Churn Co., Sidney, O.

Clamps.
Hammer & Co., Branford, Conn.
Le Count, C. W., So. Norwalk, Conn.

Clipping Machines.
Hotchkiss, E. S., Bridgeport, Conn.
McCoy, Jos. F. & Co., 26 Warren St.

Coal.
Barns, C. K. & Co., Philadelphia, Pa.
Wister, Francis, Philadelphia, Pa.

Coffee and Spice Mills.
Sun Mfg. Co., Greenfield, O.
Waddell Wooden Ware Works, Greenfield, O.

Coke.
Barns, C. K. & Co., Philadelphia, Pa.

Houston, C. B. & Co., Philadelphia, Pa.
Rainey, W. J., Cleveland, O.
Sibell, Geo. H. & Co., Chicago, Ill.
Wister, Francis, Philadelphia, Pa.

Collections.
Hardware Board of Trade (Limited) 4 and 6 Warren, N. Y.

Condensers.
Worthington, Henry R., 86 & 88 Liberty Street, N. Y.

Conveying Machinery.
Brown Hoisting & Conveying Machine Co., Cleveland, Ohio.
Jeffrey Mfg. Co., Columbus, O.
Link Belt Engineering Co., Phila., Pa.

Copper.
Ames Sword Co., Chicopee, Mass.
Ansonia Brass & Copper Co., 19 and 23d Cliff, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
New Haven Copper Co., 294 Pearl, N. Y.
Randolph & Clowes, Waterbury, Conn.
Wister, Francis, Philadelphia, Pa.

Coppersmith.
Emory, F. P. Mfg. Co., Springfield, Mass.

Cordage.
Samson Cordage Works, Boston, Mass.

Cork Screws.
Detroit Cork Screw Co., Detroit, Mich.
Williamson, C. T. Wire Novelty Co., Newark, N. J.

Cornice Brakes.
Bertsch & Co., Cambridge City, Ind.
Robinson, J. M. & Co., Cincinnati, O.

Corn Huskers.
Hall & Ross Husking Glove Co., Chicago, Ill.
Moore & Wickert, Green River, Ohio.

Corrugated Furnaces.
Continental Iron Wks., Brooklyn, N. Y.

Corrugated Iron.
Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.
Moseley Iron Bridge & Roof Co., 5 Day N. Y.

Counting Machines.
Durant, W. N., Milwaukee, Wis.
Osborn, G. Edw. & Co., New Haven, Ct.

Coupling.
Almond, T. R., Brooklyn, N. Y.

Coverings, Boiler and Pipe.
Johns, H. W. Mfg. Co., 37 Maiden Lane.

Cranes.
Detroit Foundry Equipment Co., Detroit, Mich.
Maris & Beekley, Philadelphia, Pa.
Ridgway, Craig & Sons, Coatesville, Pa.
Sellers, Wm. & Co., Inc., Phila., Pa.
Yale & Towne Mfg. Co., Stamford, Conn.

Cupolas, Hot-Blast.
Byram & Co., Detroit, Mich.
Collins, Victor, Detroit, Mich.
Detroit Fdry. Equipment Co., Detroit, Mich.

Curry Combs.
Kohler, F. E. & Co., Canton, O.

Cutlery Cases.
Torrey, J. R. & Co., Worcester, Mass.

Cutlery, Importers of.
Field, Alfred & Co., 93 Chambers St., New York.

Gurney, Fred B., 116 Chambers St., N. Y.
Sickles, Sweet & Lyon, 35 Barolay, N. Y.

Cutlery, Manufacturers of.
Curley, J. & Bro., 6 Warren St., N. Y.
Dane, Stoddard & Kendall, Boston, Mass.

Electric Cutlery Co., 113 Chambers, N. Y.
Goodell Co., Antrim, N. H.
Northampton Cutlery Co., Northampton, Mass.

Schmactenberg Bros., 98 Chambers Street, N. Y.
Wilson, John, Sheffield, England.

Cutting-off Tools.
Bicycle Bros., Hartford, Conn.

Designer, Metal Work.
Arnold, F. H., New Britain, Conn.

Dies.
Wilson, J. Fred, Worcester, Mass.

Dog Collars.
Chapman Mfg. Co., Meriden, Conn.
Kelley & Woolworth, Niagara Falls, N. Y.
Union Hardware Co., Torrington, Ct.

Door Bells.
Graham, Jno. H. & Co., 113 Chambers St., N. Y.

Door Checks.
Utility Door Check Co., Chicago, Ill.

Door Knobs.
Bardsley, J., 149 & 151 Baxter St., N. Y.

Drain Cleaners.
Buckeye Mfg. Co., Union City, Ind.

Drilling Machines.
Bickford Drill & Tool Co., Cinn., Ohio.
Buffalo Forge Co., Buffalo, N. Y.
Burnham, Geo. Co., Worcester, Mass.
Champion Blower and Forge Co., Lancaster, Pa.

Colburn, A. M., New Haven, Conn.
Dallett, Thos. H. & Co., Philadelphia.

Dwight Slate Machine Co., Hartford, Conn.
Halsey, Jas. T., Philadelphia, Pa.
Hamilton Mch. Tool Co., Hamilton, Ct.

Henrick & Cowell, New Haven, Conn.
Illinois Iron and Bolt Co., Carpentersville, Ill.

Norton & Jones Machine Tool Works.
Plainville, Conn.

Quint, A. D., Hartford, Conn.
Sellers, Wm. & Co., Inc., Phila., Pa.
Sibley & Ware, So. End, Ind.

Sigourney Tool Co., Hartford, Conn.
Silver Mfg. Co., Salem, O.
Smith Friction Drill & Tool Co., Boston, Mass.

Woodward & Rogers, Hartford, Conn.

Drop Forgings.
Bennett Machine Co., New Haven, Conn.
Billings & Spencer Co., Hartford, Conn.
Boone, W. C. Mfg. Co., Boston, N. J.
Eccles, Richard, Auburn, N. Y.
Herbrand Co., Fremont, O.
Merrill Bros., Brooklyn, N. Y.

Miner & Peck Mfg. Co., New Haven, Ct.
Phila. Drop Forge Co., Philadelphia, Pa.
Scranton Forging Co., Scranton, Pa.
Spiera, J. C. & Co., Worcester, Mass.
Williams, J. H. & Co., Brooklyn, N. Y.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.

Wyman & Gordon, Worcester, Mass.

See Alphabetical Index, Pages 107 & 108.

- Drop Presses.**
Bliss, E. W. Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Ferracute Mch. Co., Bridgeport, N. J.
Miser & Peck Mfg. Co., New Haven, Conn.
Robinson, J. M. & Co., Cincinnati, O.
Stiles & Parker Press Co., Brooklyn, N. Y.
Vulcan Iron Works, Chicago, Ill.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
- Dumb Waiters.**
Storm Mfg. Co., Newark, N. J.
- Dust Beaters.**
Peabody & Parks, Troy, N. Y.
- Dynamite.**
New York Powder Co., 62 Liberty St. N. Y.
- Dynamos.**
C. & C. Electric Motor Co., 402 and 404 Greenwich St., N. Y.
Detroit Dynamo Co., Detroit, Mich.
Lovell Mfg. Co., Ltd., Erie, Pa.
Zucker & Lovett Chemical Co., 10 1/2 Grand St., N. Y.
- Edge Tools. Makers of.**
Buck Bros., Millbury, Mass.
Butcher, W. & S., 135 Duane St., N. Y.
Buffalo Edge Tool Wks., Buffalo, N. Y.
Plumb, Fayette R., Philadelphia, Pa.
Warren Axe & Tool Wks., Warren, Pa.
White, L. & I. J. Co., Buffalo, N. Y.
- Egg Beaters.**
North Bros. Mfg. Co., Philadelphia, Pa.
- Electric Bells and Supplies.**
Ostrander, W. R. & Co., 204 Fulton St., New York
Wollensak, J. F., Chicago, Ill.
- Electric Dynamo Machines.**
Eddy Electric Mfg. Co., Windsor, Conn.
Hanson & Van Winkle Co., Newark, N. J.
- Electric Welding.**
Thomson Electric Welding Co., Boston, Mass.
- Electro-Platers.**
Boardman, L. & Son, East Haddam Ct.
- Elevator Buckets.**
W. J. Clark & Co., Salem, Ohio.
- Elevators. Makers of.**
Link-Belt Engineering Co., Phila., Pa.
Morse, Williams & Co., Phila., Pa.
Salem Fdry & Mch. Co., Salem, Mass.
- Emery and Emery Wheels.**
Bell, Geo. E., 38 John St., N. Y.
Grant Corundum Wheel Mfg. Co., Worcester, Mass.
N. Y. Belting & Packing Co., Ltd., N. Y.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.
Springfield Emery Wheel Mfg. Co., Bridgeport, Conn.
- Enamels.**
Nubian Iron Enamel Co., Cragin, Ill.
- Engineers and Contractors.**
Aiken Henry, Pittsburgh, Pa.
Artificial Gas Engineering Co., Pittsburgh, Pa.
Carten, Henry J., Pittsburgh, Pa.
Herrick, J. A., 284 Pearl St., N. Y.
Kennedy, Julian, Pittsburgh, Pa.
Laughlin, Alex. & Co., Pittsburgh, Pa.
Lean, D. R. Co., Pittsburgh, Pa.
McCune, A. M., Pittsburgh, Pa.
Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa.
Roberts, Frank C., Philadelphia, Pa.
Smythe, S. R. Co., Incorporated Pittsburgh, Pa.
Swindell, W. & Bros., Pittsburgh, Pa.
Wilkie, Bothwell & Co., Ltd., Pittsburgh, Pa.
Witherow, Jas. P. Co., Pittsburgh, Pa.
- Engines. Gas.**
Otto Gas Engine Works, Phila., Pa.
Rollason Gas Engine, Havemayer Bldg., N. Y.
- Engines. Steam. Makers of.**
Bass Foundry & Machine Works, Ft. Wayne, Ind.
Buckeye Engine Co., Salem, O.
Erie Engine Works, Erie, Pa.
Harrisburg Fdy. & Machine Works, Harrisburg, Pa.
Lane & Bodley Co., Cincinnati, O.
Norwalk Iron Works Co., So. Norwalk, Conn.
Phila. Engineering Works, Phila., Pa.
Phoenix Iron Wks. Co., Meadville, Pa.
Shipman Engine Co., Boston, Mass.
Southwark Foundry and Machine Co., Phila., Pa.
Tod, William & Co., Youngstown, O.
Wetherill, Robt. & Co., Chester, Pa.
- Exhaust Tumblers.**
Sweetser, W. A., Brockton, Mass.
- Expansion Bolts.**
Boone, W. C. Mfg. Co., Boonton, N. J.
Church, Isaac, Toledo, O.
- Faucets, Self-Measuring.**
Lane Bros., Poughkeepsie, N. Y.
- Faucets. Wooden. Makers of.**
Boston & Lockport Block Co., Boston, Mass.
Lockport, N. Y.
John Sommer's Son, Newark, N. J.
- Feed-Water Heaters.**
Davis, I. H. & Son, Hartford, Conn.
Goubert Mfg. Co., 32 Cortlandt St., N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
National Pipe Bending Co., New Haven, Conn.
Webster, Warren & Co., Camden, N. J.
Whitlock Coil Pipe Co., Elmwood, Conn.
- Fencing. Iron and Wire.**
Sarnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Clinton Wire Cloth Co., Clinton, Mass.
DeKalb Fence Co., DeKalb, Ill.
Gilbert & Bennett Mfg. Co., 42 Cliff St., Hartman Mfg. Co., Elmwood City, Pa.
Kilmer Mfg. Co., Newburgh, N. Y.
- Files. Importers of.**
Moss, F. W., 80 John, N. Y.
- Files and Rasps. Manufacturers of.**
Banker & White, Troy, N. Y.
Barnett, G. & H., 41 & 43 Richmond Phila.
Butcher, W. & S., 135 Duane St., N. Y.
McCauley File Co., Philadelphia.
Nicholson File Co., Providence R. I.
- Fire Brick. Makers of.**
Borgner, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Treischer & Sons, Foot R., Houston, St. McLeod & Barry Co., Troy, N. Y.
Maurer, H. & Son, 420 E. 23d, N. Y.
Ostrander Fire Brick Co., Troy, N. Y.
Valentine, M. D. & Bro., Woodbridge.
- Fire Sets.**
Troy Nickel Works, Troy, N. Y.
- Fishing Tackle.**
Dane, Stoddard & Kendall, Boston, Mass.
- Flint and Emery Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Flour Sifters.**
Meyers, F. J. Mfg. Co., Covington, Ky.
- Fly Fans.**
Matthai, Ingram & Co., Baltimore, Md.
- Fly Traps.**
Cincinnati Mfg. Co., Cincinnati, O.
- Fodder Cutters.**
Silver Mfg. Co., Salem, O.
- Forges. Portable. &c.**
Bullock Bellows Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Empire Portable Forge Co., Lansingburg, N. Y.
Foss Mfg. Co., Springfield, Ohio.
Sturtevant, B. F. Co., Boston, Mass.
- Forgings, Iron and Steel.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Scranton Forging Co., Scranton, Pa.
- Foundry Facings.**
Chicago Fdy. Supply Co., Chicago, Ill.
MacKellar Foundry Facing & Supply Co., Quincy, Ill.
Parson, J. W. & Co., Phila.
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cinn., O.
- Foundry Kiddles.**
Estey, W. S., 65 Fulton, N. Y.
- Foundry Supplies.**
Chicago Fdy. Supply Co., Chicago, Ill.
Collins, Victor, Detroit, Mich.
MacKellar Fdy. Facing & Supply Co., Quincy, Ill.
S. Obermayer Co., Cincinnati, O.
Parson, J. W. & Co., Philadelphia.
Smith, J. D. Fdy. Supply Co., Cinn., O.
- Friction Clutches.**
Keystone Clutch & Mch. Wks., Phila., Pa.
Moore & White Co., Philadelphia, Pa.
- Fruit Presses.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Furnaces, Foundry.**
Byram & Co., Detroit, Mich.
- Furnaces, Gasoline.**
Burgess Soldering Fca. Co., Columbus, Ohio.
- Gas Producers.**
Wood, R. D. & Co., Philadelphia, Pa.
- Gas & Steam Fitters' Supplies.**
Pancoast, Henry B. & Co., Phila., Pa.
- Gauge, Rolling Mill.**
Haines Gauge Co., Philadelphia, Pa.
- Gear Cutters.**
D. E. Whiton Mach. Co., New London, Conn.
- Gears.**
Roston Gear Works, Boston, Mass.
New Process Raw Hide Co., Syracuse, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.
Union Fdy. & Mch. Co., Pittsburgh, Pa.
- Glass Boards.**
Canton Saw Co., Canton, O.
- Glass Tubes.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
- Glass Cutters.**
Monce, S. G., Bristol, Conn.
- Glue.**
Baeder, Adamson & Co., Phila., Pa.
Russia Cement Co., Gloucester, Mass.
- Grass Catchers.**
Supplee Hardware Co., Phila., Pa.
Thompson Mfg. Co., Elkhart, Ind.
- Grinding and Polishing Machines.**
Herrick & Cowell, New Haven, Conn.
Norton Emery Wheel Co., Worcester, Mass.
Washburn Shops, Worcester, Mass.
- Grinding Mills.**
Foss Mfg. Co., Springfield, O.
- Grindstone Dressing Machinery.**
Blake & Johnson, Waterbury, Conn.
- Grindstones.**
Cleveland Stone Co., Cleveland, O.
- Gun Implements.**
Union Hdwy. Co., Torrington, Conn.
- Gunpowder, Makers of.**
Lafin & Rand Powder Co., 29 Murray St., N. Y.
- Hand Carts.**
Lansing Wheelbarrow Co., Lansing, Mich.
- Hand Screws.**
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
- Halter Chains.**
Keller & Woolworth, Niagara Falls, N. Y.
- Handles.**
New Process Raw Hide Co., Syracuse, N. Y.
New York Mallet and Handle Wks., 466 E. Houston St., N. Y.
- Hangers, Door.**
Chicago Spring Butt Co., Chicago, Ill.
Croft & Hanger Co., Elmira, N. Y.
Lane Bros., Poughkeepsie, N. Y.
Victor Mfg. Co., Newburyport, Mass.
- Hardware Comm'n Merchants.**
Doehner, Martin, 88 Chambers, N. Y.
Field, Alfred & Co., 93 Chambers St., N. Y.
Graham, John H. & Co., 111 Chambers St., New York.
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**
Hotchkiss, E. S., Bridgeport, Conn.
Stearns, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 103 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs. Agents.**
Bingham, W. Co., Cleveland, O.
Graham, John H. & Co., 113 Chambers, N. Y.
Hussey E. J. & Co., 80 John St., N. Y.
McCoy, Jos. F. Co., 28 Warren St., N. Y.
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
Underhill, Clinch & Co., 94 Chambers St., N. Y.
- Hardware Specialties.**
Acme Shear Co., Bridgeport, Conn.
Selden Machine Co., New Haven, Conn.
Clark Mfg. Co., Buffalo, N. Y.
Empire Portable Forge Co., Lansingburg, N. Y.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Gwinner Mfg. Co., Hamilton, O.
Haines & Zimmerman, Phila. Pa.
Hart, H. C. Mfg. Co., Detroit, Mich.
Henn, A. S. & Co., New Haven, Conn.
Johnson, S. C., Racine, Wis.
Knapp & Cowles Mfg. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Philadelphia, Pa.
Peabody & Parks, Troy, N. Y.
Welland, Chas., 143 Chambers St., N. Y.
Wilson, Wm., Worcester, Mass.
Wire Goods Co., Worcester, Mass.
Underhill, Clinch & Co., 94 Chambers Street, N. Y.
- Hardware, Yacht and Ship.**
Ferdinand, L. W. & Co., Boston, Mass.
- Harness Snaps.**
Covert Mfg. Co., West Troy, N. Y.
Coverts' Saddlery Wks., Farmer, N. Y.
Fitch, W. & E. T., New Haven, Conn.
- Hay Knives.**
Holt, Hiram, Co., E. Wilton, Me.
- Hoisting Machines.**
Holt, Alfred & Co., 313 Green, Phila.
Brown Hoisting & Conveying Mch. Co., Cleveland, Ohio.
Fulton Iron & Engine Wks., Detroit, Mich.
Harrington, E. Son & Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 96 Liberty, N. Y.
Maris & Beekley, Philadelphia, Pa.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila. and N. Y.
Spindel, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.
- Hollow-Ware.**
Bronson Supply Co., Cleveland, Ohio.
Cleveland Stamping & Tool Co., Cleveland, O.
Start & Peterson Co., Phila., Pa.
- Holloware, Aluminum.**
Illinois Pure Aluminum Co., Lemont, Ill.
- Horse and Barbers' Clippers.**
Hotchkiss, E. S., Bridgeport, Conn.
- Horse Nails. Makers of.**
National Horse Nail Co., Vergennes, Vt.
- Horse Shoes. Makers of.**
Stryden Horse Shoe Co., Catsaqua, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence.
Standard Horse Shoe Co., Boston, Mass.
- Hose.**
Cleveland Rubber Co., Cleveland, O.
N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.
- Hotels.**
The Audubon, Chicago, Ill.
- Hydrants, &c.**
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Jacks.**
Dudgeon, Richard, 24 Columbia, N. Y.
Watson & Sullivan, 204 E. 43d, N. Y.
- Ice-Cream Freezers.**
North Bros. Mfg. Co., Phila., Pa.
Packer, C. V., Philadelphia, Pa.
White Mountain Freezer Co., Nashua, N. H.
- Ice Shavers.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Ice Tongs.**
Stoppard, Robt., Auburn, N. Y.
- Injectors.**
Jenkins Bros., New York
Sherwood Mfg. Co., Buffalo, N. Y.
- Insurance. Boiler.**
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel, Swedish.**
Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., Broadway, N. Y.
- Iron Commission Brokers.**
Corning, Edw. & Co., 29 B'way, N. Y.
Cotton, Bradley & Co., Philadelphia.
Edging, Edw. J., Philadelphia.
Hogan, John L. & Co., Philadelphia.
Hoffman, J. W. & Co., Philadelphia.
Levis, Henry & Co., Philadelphia.
Keeley, Jerome & Co., Philadelphia.
Lee, J. Tattall & Co., Philadelphia.
Mohr, J. J., 430 Walnut, Philadelphia.
Mann, E. R. & Co., Philadelphia.
Pilling & Crane, Philadelphia, Pa.
Sibell, Geo. H. & Co., Chicago, Ill.
Wilhelm & Co., Harrisburg, Pa.
Wister, L. & R. & Co., Phila., Pa.
- Iron Ore.**
Naylor & Co., 45 Wall, N. Y.
Pickands, Brown & Co., Chicago, Ill.
Fullman, J. Wesley, Phila., Pa.
Samuel, Frank, Philadelphia, Pa.
- Iron. Merchants.**
Barnes, C. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Bussanits & Cunliffe, Philadelphia.
Corning Edw. & Co., 29 B'way, N. Y.
Cox, Justice, Jr., Philadelphia.
Cotton, Bradley & Co., Philadelphia.
Hoffman, J. W. & Co., Philadelphia.
Leonard, J., 445 Wall St., N. Y.
Naylor & Co., 45 Wall St., N. Y.
Nicolls, Wheeler & Co., Philadelphia.
Ogden & Wallace, 85 Elm St., N. Y.
Pickands, Brown & Co., Chicago, Ill.
Pierson, D. W., 29 Broadway, N. Y.
Richards, D. W. & Co., 88 Manhatn St., N. Y.
Thomson, W. H. & Co., Phila., Pa.
Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wilson, E. H. & Co., Philadelphia.
- Iron. Importers.**
Abbott, Jere & Co., N. Y. and Boston.
Lundberg, Gustaf, Boston, Mass.
- Iron. Sheet. Manufacturers of.**
Cambridge Iron & Steel Co., Cambridge, Ohio.
W. Dewees Wood Co., Lim., McKeesport, Pa.
- Ironwork. Ornamental.**
Barum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Keys.**
Wollensak, J. F., Chicago, Ill.
- Ladies.**
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamp Stoves.**
Glazier Stove Co., Chelsea, Mich.
- Lamps.**
Standard Lighting Co., Cleveland, O.
- Lanterns.**
Dietz, R. E., Co., 60 Light St., N. Y.
Ohio Lantern Co., Tiffin, Ohio.
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Lathes.**
Draper Machine Tool Co., Worcester, Mass.
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, Wire.**
Clinton Wire Cloth Co., Clinton, Mass.
N. J. Wire Cloth Co., Trenton, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Laundry Machines.**
Johnson, S. C., Racine, Wis.
- Lawn Mowers.**
Chadborn & Coldwell Mfg. Co., Newburgh, N. Y.
Champion Mfg. Co., Richmond, Ind.
Coldwell Lawn Mower Co., Newburgh, N. Y.
F. & N. Mfg. Co., Richmond, Ind.
Henley, M. C., Richmond, Ind.
Lape, W. E., Syracuse, N. Y.
Mast, Foss & Co., Springfield, O.
Stearns, E. C. & Co., Syracuse, N. Y.
Supplee Hdwy. Co., Phila., Pa.
- Lawn Rakes.**
Schaeffer & Co., Dayton, Ohio.
Syracuse Specialty Mfg. Co., Syracuse, N. Y.
- Lawn Sprinklers.**
Ette & Henger Mfg. Co., St. Louis.
McGowan, John H. Co., Cincinnati, O.
- Lawn Sweepers.**
Lape, W. E., Syracuse, N. Y.
- Lemon Squeezers.**
Ripley Mfg. Co., Unionville, Conn.
- Letters, Paper.**
Tablet & Ticket Co., Chicago, Ill.
- Levels.**
Davis & Cook, Watertown, N. Y.
Richardson, C. F. & Son, Athol, Mass.
- Locks & Knobs. Manufacturers of.**
Dietz, A. E., 97 Chambers, N. Y.
Keyless Lock Co., Chicago, Ill.
Reading Hdwy. Co., Reading, Pa.
Smith & Egge Mfg. Co., Bridgeport, Conn.
Yale & Towne Mfg. Co., Stamford, Conn.
- Lubricators.**
Wadham's Oil & Grease Co., Milwaukee, Wis.

See Alphabetical Index. Pages 107 & 108.

Machinery.

Am. Tool Works, Cleveland, Ohio.
 Barnes, W. F. & John, Rockford, Ill.
 Sement, Miles & Co., Philadelphia, Pa.
 Bigelow, O. E., 45 Day, N. Y.
 Bignall & Keeler Mfg. Co., St. Louis.
 Birmingham Iron Foundry, Birmingham, Conn.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Bort, Jno. L., Flushing, N. Y.
 Briggs, Marvin, 12 Broadway, N. Y.
 Carlin's Sons, Moh. Co., Allegheny, Pa.
 Cinn. Milling Mch. Co., Cincinnati, Ohio.
 Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
 Coulter & McKenzie Mch. Co., Bridgeport, Conn.
 Crutcher, D. B., Providence, R. I.
 Dietrich & Harvey Mch. Co., Baltimore, Md.
 Ehrhardt, Gustave & Sons, Pittsburgh, Pa.
 Fitchburg Mch. Works, Fitchburg, Mass.
 Garvin, Mch. Co., Leight & Canal Sts.
 Gould & Eberhardt, Newark, N. J.
 Hamilton Mch. Tool Co., Hamilton, O.
 Farrington, E. Son & Co., Phila.
 Henderer, A. L., Wilmington, Del.
 Hendey Machine Co., Torrington, Ct.
 Kenley Mch. Tool Wks., Richmond, Ind.
 Hill, Clarke & Co., Boston, Mass.
 Ingersoll Milling Machine Co., Rockford, Ill.
 Johnson, Israel H., Jr., & Co., Phila.
 Jones & Lamson Mch. Co., Springfield, Vt.
 Kelly, Daniel, Phila., Pa.
 Lodge & Shipley Mch. Tool Works, Cincinnati, Ohio.
 Lovegrove & Co., Philadelphia, Pa.
 McCabe, J. J., 68 Cortlandt, N. Y.
 Machinists Supply Co., Rochester, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Conn.
 Morton Mfg. Co., Muskegon Heights, Mich.
 National Machinery Co., Tiffin, Ohio.
 Newark Mch. Tool Works, Newark, N. J.
 New Haven Mfg. Co., New Haven, Conn.
 New York Mach'ry Depot, N. Y.
 Niles Tool Wks., 138 Liberty St., N. Y.
 Pedrick & Ayer, Philadelphia, Pa.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
 Place, Geo., 120 Broadway, N. Y.
 Poole, Robt. & Son Co., Baltimore, Md.
 Powell Planer Co., Worcester, Mass.
 Pratt & Whitney Co., Hartford, Conn.
 Prentiss Tool & Supply Co., N. Y.
 Scranton Supply & Mch'ry Co., Scranton, Pa.
 Sellers, Wm. & Co., Phila.
 Seyfert's Sons L. F., Philadelphia, Pa.
 Steptoe, J. & Co., Cincinnati, O.
 Stow Flexible Shaft Co., Ltd., Phila.
 Toomey, Frank, Philadelphia, Pa.
 Wetherill, Robert & Co., Chester, Pa.
 Wilson, W. A., Rochester, N. Y.
 Woodruff Mfg. Co., Hartford, Conn.

Machinery for Hardware Manufacturers.
 Add, Jno. & Son, New Haven, Conn.

Machine Knives.
 Loring Coes & Co., Worcester, Mass.
 Loyd, John, 558-562 Water St., N. Y.

Machine Tools.—See machinery.

Machine Work.
 Papping, J., 58th St., & 11th Ave., N. Y. City.

Machinists' Scales.
 Coffin & Leighton, Syracuse, N. Y.
 Starrett, L. S., Athol, Mass.

Machinists' Tools and Supplies.
 King, J. M. & Co., Waterford, N. Y.
 Sellers, Wm. & Co., Inc., Phila.

Mallets.
 N. Y. Mallet & Handle Works, N. Y.

Mangles.
 Johnson, S. C., Racine, Wis.

Measuring Tapes.
 Lufkin Rule Co., Saginaw, Mich.

Meat Cutters.
 Enterprise Mfg. Co., Philadelphia, Pa.

Metals.
 Fearing, Wm. S., 100 Chambers, N. Y.
 Hendricks Bros., 49 Cliff, N. Y.
 Naylor & Co., 45 Wall, N. Y.

Metal Brokers.
 American Metal Co., N. Y.

Metallurgists.
 Britton, J. Blodgett, Phila.

Metal Saws.
 Ehrhardt, Gastave & Sons, Pittsburgh, Pa.
 Q & C Co., Chicago, Ill.

Milling Machines.
 Cinn. Milling Mch. Co., Cincinnati, Ohio.
 Ingersoll Milling Machine Co., Rockford, Ill.
 Pedrick & Ayer, Phila. Pa.

Mining Knives.
 Palmer Hdw. Mfg. Co., Troy, N. Y.

Mine Lamps.
 Darby, Edw. & Sons, Phila. Pa.
 Leonard, B. E., Scranton, Pa.
 Leonard, T. F., Scranton, Pa.

Mining Screens.
 Harrington & King Perforating Co., Chicago, Ill.
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.
 Howard & Morse, 45 Fulton, N. Y.

Mirrors.
 Rice, C. F., Chicago, Ill.

Molding Sand.
 Chicago Foundry Supply Co., Chicago, Ill.
 Obermayer, S. Co., Cincinnati, O.
 Faxson, J. W. & Co., Phila.

Motors, Water and Electric.
 C. & O. Electric Motor Co., 402 and 404 Greenwich St., N. Y.
 Dallett, Thos. H. & Co., Phila., Pa.
 Thomson, Houston Motor Co., Boston, Mass.

Mail Machinery.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.

Nails (Cut) and Spikes.

Borden & Lovell, 70 West, N. Y.
 Cumberland Nail & Iron Co., Phila.
 Oxford Iron Co., 81 Washington, Pa.
 Pottstown Iron Co., Pottstown, Pa.
 Riverside Iron Wks., Wheeling, W. Va.

Nickel Platers' Supplies.
 Eddy Electric Mfg. Co., Windsor, Conn.
 Hanson & Van Winkle Co., Newark, N. J.
 Zicker & Levert Chemical Company, 10 to 14 Grand St., N. Y.

Norway Shapes, Rollers of.
 Rowland, William & Harvey, Frankford, Philadelphia

Nut Machines.
 Dunham Nut Mch. Co., Unionville, O.

Nuts, Bolts, &c., Makers of.
 American Bolt Co., Lowell, Mass.
 American Screw Co., Providence, R. I.
 Blake & Johnson, Waterbury, Conn.
 Black, H. C. L., Pawtucket, R. I.
 Mt. Carmel Bolt Co., Mt. Carmel, Conn.
 Fort Chester Bolt and Nut Co., Chester, N. Y.
 Russell, Burdall & Ward, Port Chester, N. Y.
 Sternberg, J. H. & Son, Reading, Pa.
 Wilson, J. Fred, Worcester, Mass.
 Wm. H. Haskell Co., Pawtucket, R. I.

Oil Cans and Lubricators.
 Sherwood Mfg. Co., Buffalo, N. Y.

Oil Stones.
 Pike Mfg. Co., Pike Station, N. H.

Oil Stoves.
 Glazier Stove Co., Chelsea, Mich.

Ores.
 Wister, Francis, Philadelphia, Pa.

Or Shoes.
 Scranton Forging Co., Scranton, Pa.

Packing.
 Billington, Jas. H. & Co., Phila., Pa.
 Morrison, Robt., St. Louis, Mo.
 N. Y. Belting & Packing Co., Ltd., N. Y.

Padlocks.
 Ames Sword Co., Chicopee, Mass.
 Frain, E. T., Lancaster, Pa.
 Hillebrand & Wolf, Phila., Pa.
 Miller Lock Co., Philadelphia, Pa.

Paint.
 Garry Iron & Steel Roofing Co., Cleveland, O.
 Dixon, Jos. Crutcher Co., Jersey City, N. J.

Paint Burners.
 Dangler Stove & Mfg. Co., Cleveland, O.

Patent Solicitors.
 Fitzgerald, S. C., Washington, D. C.
 Howson & Howson, Phila. & Wash'ton.
 Jenner, H. W. T., Washington, D. C.
 Stooking, E. B., Washington, D. C.

Perforated Metal.
 Clinton Wire Cloth Co., Clinton, Mass.
 Harrington & King Perforating Co., Chicago, Ill.
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Phosphor Bronze.
 Phosphor Bronze Smelting Co., Limited, 512 Arch, Philadelphia.

Phosphor Tin.
 Crescent Phosphorized Metal Co., Philadelphia, Pa.

Crosby Steam Gauge & Valve Co., Boston, Mass.
 Halk & Naumann, 516 Pearl, N. Y.

Picks and Mattocks.
 Plumb, Fayette K., Philadelphia, Pa.

Fig Iron.
 Gordon, C. B. & Co., Philadelphia, Pa.
 Mann, Edwin R., Philadelphia, Pa.
 Montour Iron & Steel Co., Danville, Pa.
 Naylor & Co., 45 Wall, N. Y.
 Pickands, Brown & Co., Chicago, Ill.
 Pilling & Crane, Philadelphia, Pa.
 Samuel, Frank, Philadelphia, Pa.

Fig Iron Storage.
 Am. Fig Iron Storage Warehouse Co., 44 Wall, N. Y.

File Drivers.
 Vulcan Iron Wks., Chicago, Ill.

Pipe, Bent.
 National Pipe Bending Co., New Haven

Pipe Cutting and Threading Machines.
 Bignall & Keeler Mfg. Co., St. Louis, Mo.
 Merrill Mfg. Co., Toledo, O.
 Pancoast Henry B. & Co., Philadelphia.
 Saunders's Sons, D., Tonkers, N. Y.

Pipe Grips.
 Prentiss Vise Co., 44 Barclay, N. Y.

Pipes, Fittings, &c., Makers of.
 McNab & Harlin Mfg. Co., N. Y.

Pipe, Water and Gas. Makers of.
 Cumberland Nail & Iron Co., Phila. Pa.
 Donaldson Iron Co., Emaus, Pa.
 Riverside Iron Works, Wheeling, W. Va.
 Wood, R. D. & Co., Philadelphia, Pa.

Plane Irons, Manufacturers of.
 Buck Bros., Millbury, Mass.

Planes, Manufacturers of.
 Stanley Rule & Level Co., N. Y.

Plate Bending Rolls.
 Schneekloth, H. A., 530 W. 28th St., N. Y.

Plate, Iron and Steel, Mfrs of.
 Extra-Standard Iron & Steel Co., Bridgeport, Ct.
 Wakens Iron & Steel Co., Coatesville, Pa.
 Mahoning Valley Iron Co., Youngstown, Ohio.
 Moorhead-JoLean Co., Pittsburgh, Pa.
 McVain & Sons, Reading, Pa.
 Pottstown Iron Co., Pottstown, Pa.
 Pottsville Iron & Steel Co., Pottsville, Pa.
 Singer, Nimick & Co., Pittsburgh, Pa.
 The Mahoning Valley Iron Co., Youngstown, Ohio.
 Wellman Iron & Steel Co., Thurlow, Pa.
 Wood Alan Co., Philadelphia.

Plating, Nickel, Brass and Silver.
 Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

Plumbago.

Chicago Fdy. Supply Co., Chicago, Ill.

Pokers and Lifters.
 Troy Nickel Works, Troy, N. Y.

Polishing Machines.
 Watson & Stillman, 204 E. 43d, N. Y.

Polishing Wheel.
 La Massena, C. E. & Co., Newark, N. J.

Post Hole Diggers.
 Buckeye Mfg. Co., Union City, Ind.
 Kohler, F. E. & Co., Canton, O.
 Wister, L. & R. & Co., Philadelphia, Pa.

Poultry Nettings.
 Barnum, E. T., Detroit, Mich.
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
 N. Y. City, N. Y.
 "Silver Finish," Trenton, N. J.
 Tyler Wire Wks. Co., W. S., Cleveland, O.
 Wright & Colton Wire Cloth Co., Worcester, Mass.

Powder.
 Ladin & Rand Powder Co., 29 Murray New York Powder Co., 62 Liberty St., N. Y.

Power Hack Saws.
 Millers Falls Co., 83 Reade St., N. Y.

Power Hammers.
 Belden Mch. Co., New Haven, Conn.
 Denelt & Eisenhardt, Philadelphia.
 Dupont Mfg. Co., St. Johnsbury, Vt.
 Jenkins & Lingie, Belletonte, Pa.

Presses, Dies, &c.
 E. W. Bliss Co., Brooklyn, N. Y.
 Carey, G. A. & Co., Chicago, Ill.
 Ferracoe Mch. Co., Bridgeton, N. J.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.
 Waterbury Mch. Co., Waterbury, Conn.

Presses, Power, Makers of.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Ct.
 Merriman, A. H., Meriden.
 Robinson, J. M. & Co., Cincinnati, O.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

Pulley Fixings.
 Foley, J. W. & Co., Cincinnati, O.

Pulleys.
 Western Pin Co., Toledo, O.
 Keystone Clutch, Mch. Wks., Phila., Pa.
 Reeves Pulley Co., Columbus, Ind.

Pulverizing Mill.
 Bradley Fertilizer Co., Boston, Mass.

Pumping Machinery.
 Coulter & McKenzie Mch. Co., Bridgeport, Conn.
 Dean Bros. Steam Pump Works, Inglewood, Mo., Seneca Falls, N. Y.
 Indianapolis, Ind.
 Hooker Corliss Steam Pump Co., Chicago, Ill.
 Lucas, C. O. & Co., Greenville, Ohio.
 McCowan, J. H. & Co., Cincinnati, O.
 Maslin, J. & Son, Jersey City, N. J.
 Norwalk Iron Wks. Co., So. Norwalk, Conn.
 Southark Fdy. & Mch. Co., Phila. Pa.
 Valley Pump Wks. Easthampton Mass.
 Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Pumps, Makers of.
 Bellevue Pump Co., Bellevue, Iowa.
 Deming Co., Salem, O.
 Douglas, W. B., Middletown, Conn.
 Mast, Foss & Co., Springfield, O.
 Myers, F. E. & Bro., Ashland, O.

Punches and Shears, Hand and Power.
 Bertsch & Co., Cambridge City, Ind.
 E. W. Bliss Co., Brooklyn, N. Y.
 Cockburn Barrow & Mch. Co., Jersey City, N. J.
 Crosby, G. A. & Co., Chicago, Ill.
 Ferracoe Mch. Co., Bridgeton, N. J.
 Henderer, A. L., Wilmington, Del.
 Robinson, J. M. & Co., Cincinnati, O.
 Schneekloth, H. A., 530 W. 28th St., N. Y.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.
 Wals & Roos, Punch & Shear Co., Cincinnati, Ohio.
 Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.
 Watson & Stillman, 204 E. 43d, N. Y.

Rails, Old and New.
 Perry, W. H. & Co., Providence, R. I.
 Schwarzenberg Bros. & Co., Cleveland O.

Rat and Mouse Traps.
 Burditt & Williams, Boston, Mass.
 Eusty, W. S., 65 Fulton, N. Y.
 Ripley Mfg. Co., Unionville, Conn.
 Sun Mfg. Co., Greenfield, O.

Razors.
 Butcher, W. & S., 135 Duane St., N. Y.
 Curley, J. & Bro., 6 Warren St., N. Y.
 Electric Cutlery Co., 118 Chambers, Del.
 Robinson, J. M. & Co., Cincinnati, O.
 Schneekloth, H. A., 530 W. 28th St., N. Y.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.
 Wals & Roos, Punch & Shear Co., Cincinnati, Ohio.
 Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.
 Watson & Stillman, 204 E. 43d, N. Y.

Refrigerator Door Fasteners.
 Conroy, P. J. & Co., Philadelphia.

Rivets.
 Blake & Johnson, Waterbury, Conn.
 Boyce Rivet Co., Muncie, Ind.
 Burden Iron Co., Tr. y, N. Y.
 Cobb & Drew, Plymouth, Mass.
 Henderson, Jas. S., 165 Greenwich, N. Y.
 Plymouth Mills, Plymouth, Mass.
 Sternberg, J. H. & Son, Reading, Pa.
 Townsend, W. F. & Co., New Brighton Pa.

Riveting Machines.
 Add, Jno. & Sons, New Haven, Conn.

Roasters and Bakers.
 Matthal, Ingram & Co., Baltimore, Md.

Rock Drills.
 Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
 Rand Drill Co., 23 Park Place, N. Y.

Rolling Mill Machinery

Birmingham Iron F'dry, Birmingham, Conn.
 Booth, The Lloyd, Co., Youngstown, O.
 Leeshburg Foundry & Mch. Co., Pittsburgh, Pa.
 Mahoning F'dry & Mch. Co., Danville, Pa.
 Morgan Construction Co., Worcester, Mass.
 Robinson-Rea Mfg. Co., Pittsburgh.
 Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.
 Trethewey Mfg. Co., Pittsburgh, Pa.
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.

Roll Lathes.
 Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.

Rolls, Chilled, Sand and Steel.
 Booth, The Lloyd, Co., Youngstown, O.
 Garrison, A. F. & Co., Pittsburgh, Pa.
 Johnson Foundry Co., Johnstown, Pa.
 Seaman, Sleeth & Black, Pittsburgh.
 Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Roofing.
 Berlin Iron Bridge Co., E. Berlin, Conn.
 Boston Bridge Works, Boston, Mass.
 Cambridge Roofing Co., Cambridge, O.
 Cincinnati Corrugating Co., Piqua, O.
 Johns, H. W. Mfg. Co., 87 Maiden Lane

Rope and Web Goods.
 Covert Mfg. Co., West Troy, N. Y.
 Covert's Saddlery Wks., Farmer, N. Y.

Rope Wheels.
 Cresson, Geo. V. Co., Philadelphia, Pa.

Rubber Goods.
 Canfield, H. O., Bridgeport, Conn.

Rules, Manufacturers of.
 Lufkin Rule Co., Saginaw, Mich.
 Standard Tool Co., Athol, Mass.
 Stanley Rule & Level Co., 29 Chambers, N. Y.

Sand Paper.
 Baeder, Adamson & Co., Phila., Pa.

Sash Balances.
 Caldwell Mfg. Co., Rochester, N. Y.
 Pullman Sash Balance Co., Rochester, N. Y.
 Stewart & Baker, Rochester, N. Y.
 Vanderbilt Sash Balance Co., Canandaigua, N. Y.

Sash Cords and Chains.
 Morton, Thos., 65 Elizabeth, N. Y.
 Ossawan Mills Co., Norwalk, Conn.
 Samson Cordage Works, Boston, Mass.
 Smith & Egge, Mfrs. Co., Bridgeport, Cincinnati Corrugating Co., Piqua, O.

Sash Locks.
 Ives, H. B. & Co., New Haven, Conn.

Sash Pulleys.
 Empire Portable Forge Co., Lansingburgh, N. Y.
 Palmer Hardware Mfg. Co., Troy, N. Y.

Sash Pulley Marker.
 Skelly, J. W. & Son, Bristol, Conn.

Sash Weights.
 Brown, E. E. & Co., Philadelphia, Pa.

Sash Weight Fasteners.
 Skelly, J. W. & Son, Bristol, Conn.

Saw Handles.
 Gwinner Mfg. Co., Hamilton, O.

Saws, Makers of.
 Diston, Henry & Sons, Phila., Pa.
 Hiles, C. A. & Co., 338-339 Carroll Ave Chicago, Ill.
 National Saw Co., 96 Reade St., N. Y.
 Simonds Mfg. Co., Fitchburg, Mass.

Saw Sets.
 Kohler, F. E. & Co., Canton, Ohio.
 Taintor Mfg. Co., 84-86 Chambers, N. Y.

Scales, Manufacturers of.
 Buffalo Scale Co., Buffalo, N. Y.
 Chatillon, John & Sons, 85-89 Cliff, N. Y.

Scrapers, Road.
 Am. Steel Scraper Co., Sidney, Ohio.
 Libbourn & Jacobs Mfg. Co., Columbus, O.
 Sidney Steel Scraper Co., Sidney, O.

Screens, Door and Window.
 Queen Anne Screen Co., Burlington Vt.

Screw Cutting Machinery.
 Wells Bros. & Co., Greenfield, Mass.
 Wiley & Russell Mfg. Co., Greenfield, Mass.

Screw Drivers.
 Brown, R. H. & Co., New Haven, Conn.
 Capitol Mfg. Co., Chicago, Ill.
 Chantrell Tool Co., Reading, Pa.
 Mayhew, H. H. Co., Shelbourne Falls, Mass.

Screw Plate and Pipe Cutter.
 Jarecki Mfg. Co., Erie, Pa.

Screws, Makers of.
 American Screw Co., Providence, R. I.
 Blake & Johnson, Waterbury, Conn.
 Wm. H. Haskell Co., Pawtucket.
 Miles, F. S., 205 Quarry, Philadelphia.
 National Screw & Tack Co., Cleveland, Ohio.
 Wylands & Co., New Haven, Conn.
 Worcester Machine Screw Co., Worcester, Mass.

Screw Saws.
 Barnes, W. F. & John, Rockford, Ill.
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Seythe Stones and Whetstones.
 Pike Mfg. Co., Pike Stat'n, N. H.
 Cleveland Stone Co., Cleveland, O.

Shafting, Makers of.
 Cresson, Geo. V. Co., Philadelphia, Pa.
 Fairmount Mch. Co., Philadelphia, Pa.
 Fitzsimons & Co., Cleveland, Ohio.
 Sellers, Wm. & Co., Inc. Phila. Pa.
 Stow Mfg. Co., Binghamton, N. Y.

Shaped Iron and Steel, Manufacturers of.
 Extra-Standard Iron & Steel Co., Bridgeport, O.

See Alphabetical Index, Pages 107 & 108.

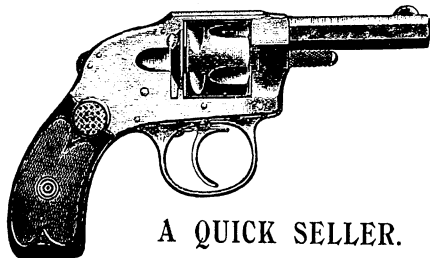
- Allentown Rolling Mill, Allentown, Pa.**
Illinois Steel Co., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Passaic Rolling Mill Co., Paterson, N.J.
Pottsville Iron & Steel Co., Pottsville, Pa.
Roberts, A. & P. & Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.
Tudor Iron Works, St. Louis, Mo.
- Shears and Scissors.**
Aame Shear Co., Bridgeport, Conn.
Heinrichs, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**
Etna-Standard Iron and Steel Co., Bridgeport, Conn.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Ches Bros., Pittsburgh, Pa.
Mahoning Valley Iron Co., Livingston, Ohio.
Moorehead-McCleane Co., Pittsburgh, Pa.
Pierston & Co., 25 Broadway, N. Y.
Relly, John W., Fort Hunter P. O., Pa.
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Alan Wood Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Metal Work.**
Clark & Cowles, Plainville, Conn.
- Sheet Zinc.**
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
- Shelf Brackets.**
Koch, A. B. & Co., Peoria, Ill.
- Shovels, Spades and Scoops.**
Myers, H. M. Co., Beaver Falls, Pa.
- Slabs.**
Douglas, W. & B., Middletown Conn.
- Skates, Ice.**
Dame, Stoddard & Kendall, Boston, Mass.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**
Hendley, M. C., Richmond, Ind.
Union Hardware Co., Torrington, Conn.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Smelting Works.**
Reeves, Paul S., 760 S. Broad, Phila.
- Speaking Tubes.**
Ostrander, W. R. & Co., 204 Fulton St., N. Y.
Wollensak, J. F., Chicago, Ill.
- Specialties, Pat. Articles.**
Konigslow, O., Cleveland, O.
- Speed Indicators.**
Church & Slight, 109 Fulton St., N. Y.
- Spelter.**
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
- Spoons and Forks.**
Holmes & Edwards Silver Co., Bridgeport, Conn.
Rogers, The Wm. Mfg. Co., Hartford, Conn.
- Sporting Goods.**
Hartley & Graham, 313-315 E'way, N.Y.
- Spring Hinges.**
Bardley, J., 149 & 151 Baxter St., N.Y.
Chicago Spring Butt Co., Chicago, Ill.
Pullman Sash Balance Co., Rochester, N. Y.
Sover Mfg. Co., Freeport, Ill.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Spring Keys and Cotter's.**
Whitman & Barnes Mfg. Co., Syracuse N. Y.
- Sprinklers.**
Smith, Oliver A., Clarkston, Mich.
- Stamped Ware.**
Am. Stamping Co., 104 & 106 John St., New York
- Stamping Works.**
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**
Cobb & Drew, Plymouth, Mass.
Titchener E. H. & Co. Binghamton N.Y.
- Steam Gauges.**
Ashcroft Mfg. Co., 111 Liberty St., N.Y.
Bristol Mfg. Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.**
Dienelt & Eisenhardt, Philadelphia.
Dudgeon, Richard, 24 Columbia Street N. Y.
Trethewey Mfg. Co., Pittsburgh, Pa.
- Steam Heating.**
Webster Warren & Co., Camden, N.J.
- Steam Separators.**
Goubert Mfg. Co., 32 Cortland St. N. Y.
Harrison Safety Boiler Wks. Phila., Pa.
- Steel Balls.**
Grant Anti-Friction Ball Co., Fitchburg, Mass.
- Steel, Cold Rolled Strip.**
Wilmot & Hobbs Mfg. Co., Bridgeport Conn.
- Steel Figures and Alphabets.**
Krossgard, W., 61 Fulton, N. Y.
- Steel Importers.**
Abbott, Jere & Co., N. Y. and Boston.
Hobson, Francis, Seaman & Co., 97 John St., N. Y.
- Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John, N. Y.**
Malne, A. & Co., 1 Broadway, N. Y.
Newton & Shipman, 83 John, N. Y.
Wetherell Bros., 98 Liberty St., N. Y.
Whitney, A. R. & Co., E'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Steel (Mushet's Special).**
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**
Etna-Standard Iron & Steel Co., Bridgeport, Conn.
Bethlehem Iron Co., S. Bethlehem, Pa.
Baker, Herman & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.
Chester Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburgh, Pa.
Eiken & Co., Hagen, Germany
Frankford Steel Co., Philadelphia
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Hobson, Francis, Seaman & Co., 97 John St., N. Y.
Illinois Steel Co., Chicago, Ill.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John, N. Y.
Kayser, Ellison & Co., Sheffield, Eng.
La Belle Steel Co., Pittsburgh, Pa.
Lukens Iron & Steel Co., Coatesville, Pa.
Moorehead-McCleane Co., Pittsburgh, Pa.
Moss, F. W., 85 John, N. Y.
Naylor & Co., 45 Wall, N. Y.
Pottsville Iron and Steel Co., Pottsville, Pa.
Relly, J. W., Fort Hunter P. O., Pa.
Rowland, Wm. & Harvey, Frankford Philadelphia
Singer, Nimick & Co., Pittsburgh.
Stanley Works, New Britain, Conn.
Steel & Iron Improvement Co., Pittsburgh, Pa.
Taylor Iron & Steel Co., High Bridge, N.J.
Wordlaw, S. & C., Sheffield, Eng.
Wetherell Bros., 98 Liberty, N. Y.
Wilmot & Hobbs Mfg. Co., Bridgeport Conn
- Steel, Manufacturers' Agents.**
Barnes, C. K. & Co., Philadelphia, Pa.
Corning, Edw. & Co., 29 B'way, N. Y.
Lindsay, Jas. G. & Co., Phila., Pa.
Pierston & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Iron Co., Johnstown, Pa.
Illinois Steel Co., Chicago, Ill.
Montour Iron & Steel Co., Danville, Pa.
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.**
Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, Eng. land, 91 John, N. Y.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders.**
Bicycle Step Ladder Co., Chicago, Ill.
Croissant, M., Albany, N. Y.
- Stocks and Dies.**
Armstrong Mfg. Co., Bridgeport, Conn.
Billings & Spencer Co., Hartford, Conn.
Butterfield & Co., Derby Line, Vt.
Hart Mfg. Co., Cleveland, O.
Saunders' Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield Mass.
- Steve Linings.**
Ostrander Fire Brick Co., Troy, N. Y.
- Steve Pipe Thimbles.**
Cheney, S. & Son, Manlius, N. Y.
- Steve Trimmings.**
Troy Nickel Works, Troy, N. Y.
- Street Lamps.**
Dietz, R. E., Co., 60 Laight St., N. Y.
Steam Gauge & Lantern Co., Syracuse N. Y.
- Strops.**
Electric Cutlery Co., 113 Chambers, N.Y.
J. R. Torrey & Co., Worcester, Mass.
- Strapping Machines.**
Schmitt, E. Lothar, 92 Reade St., N. Y.
- Structural Iron Work.**
Berlin Iron Bridge Co., East Berlin, Conn.
Boston Bridge Wks., Boston, Mass.
Lindsay, Jas. G. & Co., Phila., Pa.
Wrought Iron Bridge Co., Canton, O.
- Sulphuric Acid.**
Mathlessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**
Atlas Tack Corporation, Boston, Mass.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.
Nat. Screw & Tack Co., Cleveland O.
Phillips, E. & Sons, South Hanover.
Plymouth Mills, Plymouth, Mass.
Trafton, W. E., Whitman, Mass.
- Taps and Dies.**
Eutterfield & Co., Derby Line, Vt.
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.
Manning, Maxwell & Moore, 111 Liberty St., N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**
Riehle Bros. Testing Mch. Co., Philadelphia.
- Testing Machines.**
Riehle Bros. Testing Mch. Co., Phila.
- Theatrical Hardware.**
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**
Frost Thill Spring Co., Boston, Mass.
Sabin Machine Co., Montpelier, Vt.
- Time Record.**
Scattergood, H. W., Phila., Pa.
- Tinners' Hardware.**
Berger Bros., Philadelphia, Pa.
- Tin Plate Machinery.**
Lloyd Booth Co., Youngtown, Ohio.
- Tinware.**
Am. Stamping Co., 104 & 106 John St., Matthal, Ingram & Co., Baltimore, Md.
- Tire Upsetters.**
Butts & Ordway, Boston, Mass.
Illinois Iron & Bolt Co., Carpentersville, Ill.
- Toe Calks, Steel.**
Burke, F. P., Boston, Mass.
- Tool Chests.**
Am. Tool Co., 200 W. Houston St., N. Y.
- Tools.**
Britton, Horace E., Stoughton, Mass.
Brown, R. H. & Co., New Haven, Conn.
Chantrell Tool Co., Reading, Pa.
Fraser Co., 19 Warren St., New York.
Mayhew, H. E. Co., Shelburne Falls, Mass.
Millers Falls Co., 93 Reade, N. Y.
Richeson, C. F. & Son, Athol, Mass.
Standard Tool Co., Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, Starrett, L. S., Athol, Mass.
Tower & Lyon, 95 Chambers St., N. Y.
- Tools, Blacksmith and Wheelwrights.**
Buffalo Forge Co., Buffalo, N. Y.
Butts & Ordway Boston, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Illinois Iron & Bolt Co., Carpentersville, Ill.
Plumb, Fayette R., Philadelphia, Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'.**
Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasolene.**
Dangler Stove & Mfg. Co., Cleveland, O.
Schneider & Trenkamp Co., Cleveland, Ohio.
Standard Lighting Co., Cleveland, O.
- Transom Lifters.**
Wollensak, J. F., Chicago, Ill.
- Tree Protectors.**
High Fence & Wire Wks., Columbus, Ohio.
- Trunks, Manufacturers of.**
Berger Bros., Philadelphia, Pa.
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Clark, G. P., Windsor Locks, Conn.
Lansing Wheelbarrow Co., Lansing Mich.
- Tubes, Seamless Drawn Copper.**
Angonia Brass & Copper Co., 19 and 21 Ct., N. Y.
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**
Leg's John S. Son & Co., 4 Fletcher St., New York
Mannesmann Tube Co. Ltd., Landore, England.
Shelby Steel Tube Co., Shelby, O.
- Tumbling Barrels.**
Henderson Bros., Waterbury, Conn.
- Turnbuckles.**
Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Machine Co., New Bedford, Mass.
New Process Twist Drill Co., Taunton, Mass.
Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**
Best, Fox & Co., Pittsburgh, Pa.
Chapman Valve Mfg. Co., Boston.
Jenkins Bros., 71 John, N. Y.
McNab & Harlin Mfg. Co., 66 John N. Y.
Mason Regulator Co., Boston, Mass.
- Ventilating Fans.**
Hurvet & Smith Mfg. Co., Detroit, Mich.
- Ventilator Appliances.**
Howard & Morse, 45 Fulton, N. Y.
- Vise Jaws.**
Newark Mch. Tool Co., Newark, N. J.
- Vises.**
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Millers Falls Co., 93 Reade St., N. Y.
Prentiss Vise Co., 44 Barclay N. Y.
Tower & Lyon, 95 Chambers St., N. Y.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Wagon Jacks.**
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.
- Washers.**
Haskell Wm. H. Co., Pawtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Sternbergh, J. H. & Son, Reading, Pa.
- Washing Machines.**
Neff, W. H., Cowan, Ind.
Stearns Mfg. Co., Connorsville, Ind.
Wayne, A. Mfg. Co., Ft. Wayne, Ind.
- Water Meters.**
Worthington, H. Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**
Poole, Robt. & Son Co., Baltimore, Md.
- Well Machinery.**
Amer. Well Works, Aurora, Ill.
- Wheelbarrows.**
Akron Tool Co., Akron, O.
Amer. Steel Scraper Co., Sidney, Ohio.
Cockburn Barrow & Mch. Co., Jersey City, N. J.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
- Lansing Wheelbarrow Co., Lansing, Mich.**
Sidney Steel Scraper Co., Sidney, O.
Sweatt Mfg. Co., Minneapolis, Minn.
Toledo Wheelbarrow Wks., Toledo, O.
- Whips.**
American Whip Co., Westfield, Mass.
- Window Cord, Makers of.**
Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**
Amer. Spiral Spring Co., Pittsburg, Pa.
Consolidated Steel & Wire Co., St. Louis, Mo.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
New Haven Wire Mfg. Co., New Haven, Conn.
Salem Wire Nail Co., Salem, O.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester Wetherell Bros., 93 Liberty St., F. Y.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**
Barnum, E. T., Detroit, Mich.
Clinton Wire Cloth Co., Clinton, Mass.
Darby, Edward & Sons, Philadelphia.
Ester, W. S., 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co., 42 Cliff.
Howard & Morse, 45 Fulton, N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
Reliance Wire & Iron Wks., Milwaukee Wis.
Scheerer & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
W. S. Tyler Wire Works Co., Cleve'd.
- Wire Cutters.**
Cronk Hanger Co., Elmira, N. Y.
Higginum Hdw. Co., Higginum, Conn.
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**
McFarland, Wm., Trenton, N. J.
Newton & Shipman, 83 John, N. Y.
- Wire Door Mats.**
Hartman Mfg. Co., Elwood City, Pa.
White Mfg. Co., Minneapolis, Minn.
The Wire Goods Co., Worcester, Mass.
- Wire Fences.—See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**
Darby, Edward & Sons, Phila.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Ludlow-Saylor Wire Co., St. Louis.
Ossawan Mills Co., Norwich, Conn.
Scheeler & Sons, Buffalo, N. Y.
Whitman & Barnes Mfg. Co., Syracuse, N. Y.
- Wire Goods Co., Worcester, Mass.**
Wickwire Bros., Cortland, N. Y.
Williamson, C. T. Wire Novelty Co., Newark, N. J.
- Wire Machinery.**
Am. Tool Wks., Cleveland, O.
Manville, E. J. Mch. Co., Waterbury, Ct.
Morgan Construction Co., Worcester, Mass.
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**
Adt, John & Son, New Haven, Conn.
- Wire Nails.**
Consolidated Steel & Wire Co., St. Louis, Mo.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
Phillips, E. & Sons, South Hanover Mass.
Phillips, Townsend & Co., Phila., Pa.
Plymouth Mills, Plymouth, Mass.
Salem Wire Nail Co., Salem, O.
Taunton Wire Nail Co., Taunton, Mass.
Whitney, A. R. & Co., New York, N. Y.
- Wire Rops, Iron and Steel Makers.**
Broderick & Bascom Rope Co., St. Louis, Mo.
California Wire Works, San Francisco.
Hazard Mfg. Co., Wilkesbarre, Pa.
A. Leschen & Sons Rope Co., St. Louis.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Williamsport Wire Rope Co., Williamsport, Pa.
- Wood-Working Machinery.**
Seneca Falls Mfg. Co., Seneca Falls, N.Y.
- Wrenches, Manufacturers of.**
Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings, Spencer & Co., Hartford, Conn.
Capitol Mfg. Co., Chicago, Ill.
Central Iron & Steel Co., Brazil, Ind.
Coes Wrench Co., Worcester, Mass.
Gendron Iron Wheel Co., Toledo, O.
Keystone Mfg. Co., Buffalo, N. Y.
Portsmouth Wrench Co., Boston, Mass.
Tower & Lyon, 95 Chambers St., N. Y.
Trumont Mfg. Co., Roxbury, Mass.
Williams, J. H., Brooklyn, N. Y.
- Wringers.**
Colby Wringer Co., Montpelier, Vt.

ALPHABETICAL INDEX TO ADVERTISERS.

Abbott, Jere & Co.	19	Buckeye Mfg. Co.	69 & 82	Cushman Chuck Co.	50	Green, A. H.	96
Acme Shear Co.	75	Buffalo Forge Co.	110	Dallett, Thos. H. & Co.	52	Gurney, F. B.	75
Adt, John & Son	53	Buffalo Scale Co.	96	Dame, Stoddard & Kendall	86	Gwinner Mfg. Co.	81
Ætna-Standard Iron & Steel Co.	57	Buffalo Edge Tool Works.	74	Danger Stove & Mfg. Co.	86	Haight & Clark.	27
Alken, Henry	30	Buffalo Specialty Mfg. Co.	69	Darby, Edw. & Sons.	8	Haines & Zimmermann.	80
Akron Tool Co.	98	Bullock Bellows Co.	46	Davis & Cook.	66	Haines Gauge Co.	28
Alexander Bros.	39	Burden Iron Co.	94	Davis, I. B. & Son.	32	Halk & Naumann.	3
Allentown Rolling Mills.	29	Burditt & Williams.	83	Davol, John & Sons.	2	Hall & Ross Husking Glove Co.	99
Almond, T. R.	44	Burgess & Loxley	110	Dayton Malleable Iron Co.	110	Halsey, Jas. T.	50
Am. Bolt Co.	101	Burgess Soldering Furnace Co.	86	Dean Bros. Steam Pump Works.	38	Hamilton Machine Tool Co.	45
Am. Metal Co.	4	Burke, P. F.	95	Deltz, A. E.	93	Hammer & Co.	96
Am. Pig Iron & Storage Warrant Co.	21	Burnham, Geo. & Co.	51	DeKalb Fence Co.	9	Hanson & Van Winkle Co.	33
Am. Screw Co.	14	Burr & Houston Co.	27	Deming Co.	68	Hardware Board of Trade.	61
Am. Spiral Spring Co.	4	Bussenius & Cunliffe.	60	Detrick & Harvey Machine Co.	55	Harrington, E., Son & Co.	54
Am. Stamping Co.	101	Butcher, W. & S.	76	Detroit Cork Screw Co.	81	Harrington & King Perforating Co.	10
Am. Steel Scraper Co.	98	Butterfield & Co.	51	Detroit Dynamo Co.	32	Harrington & Richardson Arms Co.	80
Am. Tool Co.	85	Butts & Ordway.	47	Detroit Foundry Equipment Co.	32	Harrisburg Fdy. & Mch. Wks.	32
Am. Tool Works.	58	Byram & Co.	30	Diamond State Iron Co.	94	Harrisburg Safety Boiler Wks.	33
Am. Well Works.	36	C. & C. Electric Motor Co.	33	Dienelt & Eisenhardt.	47	Hart, Henry C. Mfg. Co.	81
Am. Whip Co.	109	Caldwell Mfg. Co.	90	Dietz, R. E. Co.	84	Hart Mfg. Co.	51
Ames Sword Co.	90	California Wire Works.	5	Disston, Henry & Sons.	71	Hartford Steam Boiler Insp. and Ins.	34
Ansonia Brass & Copper Co.	2	Cambria Iron Co.	20	Dixon, Jos., Crucible Co.	40	Hartley & Graham.	1
Arcade Malleable Iron Co.	25	Cambridge Iron & Steel Co.	25	Donaldson Iron Co.	27	Hartman Mfg. Co.	9
Armstrong Mfg. Co.	40	Cambridge Roofing Co.	16	Doscher, Martin.	75	Haskell, Wm. H. Co.	102
Arnold, F. H.	6	Canfield, H. O.	40	Douglas, W. & B.	68	Hazard Mfg. Co.	6
Artificial Gas Engineering Co.	31	Canton Saw Co.	79	Draper Machine Tool Co.	60	Heinrich's R. Sons Co.	75
Aschman Steel Casting Co.	27	Capitol Mfg. Co.	97	Dudgeon, Richard.	48	Henderer, A. L.	54
Ashcroft Mfg. Co.	38	Carbon Steel Co.	21	Duffy, J. A.	60	Henderson Bros.	31
Atlas Mfg. Co.	82	Carlin's Sons, Thomas.	60	Dunbar Bros.	5	Hendy Machine Co.	64
Atlas Tack Corporation.	12	Carpenter, J. M. Tap & Die Co.	109	Dunham Nut Machine Co.	51	Hendricks Bros.	2
Babcock & Wilcox Co.	37	Carten, Henry J.	31	Dupont Mfg. Co.	43	Hendrick Mfg. Co., Ltd.	9
Baeder, Adamson & Co.	66	Cary, Alanson.	5	Durant, W. N.	35	Henley, M. C.	83 & 100
Banker & White.	72	Chadborne & Coldwell Mfg. Co.	101	Dwight Slate Machine Co.	46	Henley Machine Tool Works.	42
Bardsley, J.	93	Chambers Bros. Co.	102	Eagle Anvil Works.	79	Henn, A. S. & Co.	80
Barnes, C. K. & Co.	22	Champion Blower & Forge Co.	51	Eccles, Richard.	92	Herbrand Co.	24
Barnes, W. F. & John.	44	Champion Iron Co.	9	Eddy Electric Mfg. Co.	33	Herrick & Cowell.	43
Barnett, G. & H.	73	Champion Mfg. Co.	100	Edge Moor Iron Co.	28	Herrick, J. A.	30
Barnum, E. T.	9	Chantrell Tool Co.	66	Ehrhardt, Gustave & Sons.	12	Hertz, T. & Son.	4
Bass Foundry & Machine Works.	35	Chapman Mfg. Co.	110	Eiken & Co.	20	Higginum Hdw. Co.	91
Belden Machine Co.	44	Chapman Valve Mfg. Co.	33	Electric Cutlery Co.	76	Hiles, C. A. & Co.	70
Bell, Geo. E.	57	Chatillon, John & Sons.	84	Emory, P. P. Mfg. Co.	9	Hillebrand & Wolf.	49
Bellevue Pump Co.	69	Cheney, S. & Son.	25	Empire Portable Forge Co.	90	Hill, Clarke & Co.	59
Bement, Miles & Co.	47	Chess Bros.	25	Erie Engine Works.	37	Hobson, F., Seaman & Co.	19
Bemis & Call Hardware & Tool Co.	96	Chester Steel Casting Co.	26	Estey, W. S.	9	Hoffman, C. & A.	79
Berger Bros.	96	Chicago Foundry Supply Co.	29	Ette & Henger Mfg. Co.	101	Hoffman, J. W. & Co.	13
Berlin Iron Bridge Co.	11	Chicago Spring Butt Co.	82	Etting, Edw. J.	18 & 28	Hogan, John L. & Co.	13
Bertsch & Co.	42	Chrome Steel Works.	24	Eureka Cast Steel Co.	110	Hoggson & Pettis Mfg. Co.	49
Best, Fox & Co.	39	Church, Isaac.	102	F. & N. Mfg. Co.	100	Hollands Mfg. Co.	69
Bethlehem Iron Co.	22	Church & Sleight.	35	Fairmount Machine Co.	55	Holmes, Booth & Haydens.	2
Bevin Bros. Mfg. Co.	80	Cincinnati Corrugating Co.	55	Fearing, Wm. S.	2	Holmes & Edwards Silver Co.	77
Bickford Drill & Tool Co.	54	Cincinnati Milling Mch. Co.	56	Ferdinand, L. W. & Co.	81	Holt, Hiram & Co.	101
Bicycle Step Ladder Co.	89	Cincinnati Mfg. Co.	82	Ferracute Machine Co.	49	Hotchkiss, E. S.	8
Bigelow, C. R.	59	Claffen Mfg. Co.	40	Field, Alfred & Co.	74	Houston, C. B. & Co.	9
Bignall & Keeler Mfg. Co.	48	Clapp, Geo. M.	59	Fitch, W. & E. T.	109	Howard Iron Works.	9
Billings & Spencer Co.	96	Clark, G. P.	99	Fitchburg Machine Works.	47	Howard & Morse.	9
Billington, J. H. & Co.	34	Clark, W. J. & Co.	92	Fitzgerald, S. C.	6	Howson & Howson.	31
Bingham, W. Co.	81	Clark Mfg. Co.	70	Fitzsimons & Co.	18	Hulbert Bros. & Co.	9
Birmingham Iron Foundry.	25	Clark & Cowles.	6	Flagg, Stanley G. & Co.	110	Hunt, Robert W. & Co.	9
Bissell, E. Son & Co.	61	Cleveland Block Co.	93	Foley, J. W. & Co.	53	Hurley Bros.	2
Blake & Johnson.	13	Cleveland City Forge & Iron Co.	1	Foos Mfg. Co.	43	Hussey, E. J. & Co.	2
Bliss Co., E. W.	41	Cleveland Rubber Works.	77	Forehand Arms Co.	83	Huyett & Smith Mfg. Co.	9
Boardman, L. & Son.	67	Cleveland Stamping & Tool Co.	87	Fraim, E. T.	90	Ideal Mfg. Co.	49
Bogert, John L.	62	Cleveland Stone Co.	56	Frankford Steel Co.	20	Illinois Iron & Bolt Co.	9
Boker, Hermann & Co.	19	Cleveland Twist Drill Co.	52	Fraser Co.	96	Illinois Pure Aluminum Co.	9
Boone, W. C. Mfg. Co.	29	Clinton Wire Cloth Co.	8	Frost Thill Spring Co.	92	Illinois Steel Co.	47
Booth, The Lloyd Co.	28	Cobb & Drew.	7	Fulton Iron & Engine Works.	37 & 54	Indiana Bicycle Co.	9
Borden & Lovell.	9	Cockburn Barrow & Machine Co.	99	Fulton Steam Boiler Wks & Foundry	31	Indiana Wire Fence Co.	9
Borgner, Cyrus.	28	Coes, Loring & Co.	97	Gardner, Jas. & Son.	28	Ingersoll Milling Machine	9
Boston Bridge Works.	10	Coes Wrench Co.	97	Garrison, A., Foundry Co.	25	Ives, H. B. & Co.	9
Boston Gear Works.	36	Coffin & Leighton.	46	Garry Iron & Steel Rfg. Co.	9	Jacobus, W. H.	9
Box, Alfred & Co.	54	Colburn, A. M.	51	Gartland Foundry Co.	24	Jarecki Mfg. Co.	9
Boyce Rivet Co.	110	Colby Wringer Co.	89	Garvin Machine Co.	50 & 62	Jeffrey Mfg. Co.	9
Bradlee & Co.	17	Coldwell Lawn Mower Co.	100	Gautier Steel Department	16	Jenkins Bros.	9
Bradley Fertilizer Co.	44	Colliau, Victor.	31	Gaylord, F. L. Co.	22	Jenkins & Ling.	9
Brass Goods Mfg. Co.	2	Conroy, P. J. & Co.	92	Gendron Iron Wheel Co.	9	Jenner, H. W.	9
Bridgeport Chain Co.	77	Consolidated Steel & Wire Co.	15	Gilbert & Bennett Mfg. Co.	9	Jessop, Wm.	9
Bridgeport De-oxidized Bronze & Metal Co.	3	Continental Iron Works.	35	Glazier Stove Co.	9	Johns, H. V.	9
Bridgeport Gun Implement Co.	52	Corning, Edw. & Co.	17	Goodell Co.	21	Johnson	9
Briggs, Marvin.	59	Cotton, Barclay W. & Co.	17	Goodell, J. W.	25	Johnson	9
Bristols' Mfg. Co.	1	Coulter & McKenzie Machine Co.	47	Goubert Mfg. Co.	89	Johnson	9
Britton, Horace E.	68	Covert Mfg. Co.	92	Gould & Eberhardt.	9	Johnson	9
Britton, J. Blodgett.	31	Covert's Saddlery Works.	65	Goulds Mfg. Co.	9	Johnson	9
Broderick & Bascom Rope Co.	6	Cox, Justice, Jr.	22	Graham, John H. & Co.	6	Johnson	9
Bronson Supply Co.	84	Cramp, Wm. & Sons S. & E. B. Co.	3	Grand Crossing Tack Co.	9	Johnson	9
Brown, E. E. & Co.	93	Crescent Horse Shoe & Iron Co.	94	Grand Rapids Hand S.	9	Johnson	9
Brown Holsting & Conveying Mch. Co.	39	Crescent Phosphorized Metal Co.	3	Grant Anti-Friction B.	9	Johnson	9
Brown, R. H. & Co.	66	Crescent Steel Co.	21	Grant Corundum W.	9	Johnson	9
Bryden Horse Shoe Co.	94	Cresson, Geo. V. Co.	45	Great Western Pl.	9	Johnson	9
Buck Bros.	75	Croissant, M.	89				
Buckeye Churn Co.	86	Cronk Hanger Co.	73				
Buckeye Engine Co.	35	Crosby, G. A. & Co.	44				

Kohler, F. E. & Co.	100	Newark Machine Tool Works.	64	Richardson, C. F. & Son.	59	Taunton Wire Nail Co.	13
Konigslow, Otto.	92	New Castle Wire Nail Co.	13	Ridgway, Craig & Son.	53	Taylor Iron & Steel Co.	24
Kreischer, B. & Sons.	26	New Haven Copper Co.	2	Riehl Bros. Testing Machine Co.	43	The Audubon.	62
Krogsrud, W.	72	New Haven Mfg. Co.	47	Ripley Mfg. Co.	70	Thompson Mfg. Co.	98
La Belle Steel Co.	23	New Haven Wire Mfg. Co.	6	Riverside Iron Works.	24	Thomson Electric Welding Co.	24
Lafin & Rand Powder Co.	25	N. J. Wire Cloth Co.	8	Roberts, A. & P. & Co.	20	Thomson-Houston Motor Co.	54
Lane Brothers.	90	New Process Twist Drill Co.	52	Roberts, Frank C. & Co.	31	Thomson, W. H. & Co.	18
Lane & Bodley Co.	45	New Process Raw Hide Co.	47	Roberts Mfg. Co.	39	Tiebout, W. J.	91
Lansing Wheelbarrow Co.	98	Newton & Shipman.	19	Robinson, J. M. & Co.	42	Titchener, E. H. & Co.	7
Lape, W. E.	101	N. Y. Belting & Packing Co.	40	Robinson-Rea Mfg. Co.	26	Tod, Wm. & Co.	35
Laughlin, Alex. & Co.	30	N. Y. Machinery Depot.	58	Rogers, The Wm. Mfg. Co.	77	Toledo Bicycle Co.	81
Lay, Jos. & Co.	86	N. Y. Mallet & Handle Works.	69	Rollason Gas Engines.	36	Toledo Block Works.	93
Lea, J. Tatnall & Co.	23	N. Y. Powder Co.	25	Rouse, Hazard & Co.	65	Toledo Wheelbarrow Works.	98
Lean, D. R. Co.	31	Nicholson File Co.	72	Rowland, Wm. & Harvey.	110	Toomey, Frank.	59
Leavitt Machine Co.	83	Nicolls, Wheeler & Co.	17	Russell, Burdall & Ward.	110	Torrey, J. R. Razor Co.	75
Le Count, C. W.	94	Niles Tool Works.	59	Russia Cement Co.	67	Totten & Hogg Iron and Steel Fdry.	
Leechburg Foundry & Machine Co.	21	North Bros. Mfg. Co.	18	St. Louis Bronze & Aluminum Works	2	Co.	25
Le Massena, C. E. & Co.	56	North Bros. Mfg. Co.	65	Sabin Machine Co.	4	Tower & Lyon.	78
Leng's, Jno. S. Son & Co.	110	Northampton Cutlery Co.	76	Salem Foundry & Machine Shop.	54	Townsend, W. P. & Co.	102
Leonard, B. E.	97	Northampton Emery Wheel Co.	56	Salem Wire Nail Co.	13	Trenton Iron Co.	4
Leonard, J.	22	Northwest Malleable Iron Co.	26	Samson Cordage Works.	1	Trenton Malleable Iron Co.	27
Leonard, T. F.	97	Norton Emery Wheel Co.	56	Samuel, Frank.	17	Threthewey Mfg. Co.	30
Leschen, A. & Sons Rope Co.	6	Norton & Jones Machine Tool Works.	39	Sargent Co.	28	Trimont Mfg. Co.	96
Levis, Henry & Co.	22	Norwalk Iron Works Co.	38	Saunders, D.	48	Troy Nickel Works.	75
Lidgerwood Mfg. Co.	110	Nourse, Fred Co.	5	Scattergood, H. W.	57	Tudor Iron Works.	1
Lindsay, Jas. G. & Co.	18	Nubian Iron Enamel Co.	53	Schaeffer & Co.	90	Tyler Wire Works Co. W. S.	64
Link-Belt Engineering Co.	44	Obermayer, S. Co.	29	Scheeler & Sons.	6	Underhill, Clinch & Co.	74
Lockhart Iron & Steel Co.	23	Ogden & Wallace.	22	Schmitz, E. Lothar.	74	Union Fdry & Mch Co.	36
Lodge & Shipley Machine Tool Co.	57	Ohio Lantern Co.	83	Schneekloth, H. A.	55	Union Hardware Co.	78
Loring, Chas. Carroll & Co.	109	Old Dominion Iron & Nail Works Co.	95	Schneider & Trenkamp Co.	86	Union Mfg. Co.	50
Lovell, Jno. P. Arms Co.	31	Osborn, G. Edw. & Co.	35	Schwarzenberg Bros. & Co.	60	Union Metallic Cartridge Co.	1
Lovell Mfg. Co., Ltd.	61	Ossawa Mills Co.	90	Scott, Geo. M.	48	Unity Door Check Co.	91
Lovell, Tracy & Co.	95	Ostrand Fire Brick Co.	28	Scoville Mfg. Co.	2	Valentine, M. D. & Bro.	28
Loyd, John.	82	Ostrander, W. R. & Co.	66	Scranton Forging Co.	94	Valley Pump Works.	38
Lovegrove & Co.	59	Otto Gas Engine Works.	36	Scranton Supply & Machine Co.	58	Van Dorn Iron Works Co.	9
Lucas, C. O. & Co.	41	Oxford Iron & Nail Co.	13	Seaman, Sleeth & Black.	25	Vanderbilt Sash Balance Co.	91
Ludlow-Saylor Wire Co.	7	Packer, C. W.	65	Sellers, Wm. & Co.	55	Van Wagoner & Williams Co.	110
Lufkin Rule Co.	69	Palmer & De Mooy.	26	Seneca Falls Mfg. Co.	54	Victor Mfg. Co.	91
Lukens Iron & Steel Co.	17	Palmer Hardware Mfg. Co.	91	Sessions Foundry Co.	26	Vulcan Iron Works.	25
Lundberg, Gustaf.	19	Pancoast Henry, B. & Co.	49	Seyfert's Sons, L. F.	58	Waddell Woodenware Works.	88
McCabe, J. J.	58	Passaic Art Casting Co.	3	Shelby Steel Tube Co.	29	Wadhams Oil & Grease Co.	36
McCaffrey File Co.	72	Passaic Rolling Mill Co.	22	Sherwood Mfg. Co.	41	Wals & Roos, P. & S. Co.	46
McCallip Fence & Wire Works.	7	Paxson, J. W. & Co.	29	Shilling Foundry Co.	29	Wallace, Wm. H. & Co.	22
McClure, Amsler & Co.	30	Peabody & Parks.	70	Shipman Engine Co.	36	Warren Axe & Tool Works.	79
McCoy, Jos. F. & Co.	82	Peck, A. G. & Co.	110	Shubert & Cottingham.	93	Wardlow, S. & C.	19
McFarland, Wm.	4	Pedrick & Ayer.	43	Shultz Belting Co.	1	Washburn & Moen Mfg. Co.	4
McGowan, J. H. & Co.	38	Peerless Foundry Co.	26	Sibell, Geo. H. & Co.	59	Washburn Shops.	51
McIlvain, Wm. & Sons.	18	Penna. Diamond Drill & Mfg. Co.	37	Sibley & Ware.	49	Waterbury Brass Co.	2
McKay, Jas. & Co.	27	Pennsylvania Mch. Co.	58	Sickles, Sweet & Lyon.	68	Waterbury Farrel Foundry & Machine Co.	38
MacKellar Fdry. Facing & Supply Co.	29	Perry, W. H. & Co.	60	Sidney Steel Scraper Co.	99	Waterbury Machine Co.	49
McKinney Mfg. Co.	89	Philadelphia Drop Forge Co.	27	Sigourney Tool Co.	46	Watson & Stillman.	45
McKinnon Dash & Hdw. Co.	95	Philadelphia Engineering Wks.	31	"Silver Finish"	5	Wayne, Anthony Mfg. Co.	87
McLean, John.	38	Phillips, E. & Sons.	13	Silver Mfg. Co.	43	Webster, Warren & Co.	34
McLeod & Henry Co.	26	Phillips, Townsend & Co.	6	Simonds Mfg. Co.	70	Weiland, Chas.	61
McNab & Harlin Mfg. Co.	35	Phoenix Horseshoe Co.	95	Singer, Nimick & Co.	23	Wellman Iron & Steel Co.	17
Machinists' Supply Co.	59	Phoenix Iron Works Co.	17	Skelly, J. W. & Son.	92	Wells Bros. & Co.	51
Mahoning Foundry & Machine Shop	24 & 55	Phosphor Bronze Smelting Co.	37	Skinner Chuck Co.	50	West Coxsackie Iron Fdy.	27
Mahoning Valley Iron Co.	22	Pickands, Brown & Co.	21	Smith & Egge Mfg. Co.	50	Western Wheel Works.	81
Main Belting Co.	40	Pierson & Co.	21	Smith, H. D. & Co.	95	Wetherell Bros. & Co.	19 & 23
Mannesmann Tube Co.	10	Pike Mfg. Co.	56	Smith, J. D. Foundry Supply Co.	29	Wetherhill, Robt. & Co.	109
Mann, Edwin R. & Co.	52	Pilling & Crane.	18	Smith, Oliver A.	98	White, L. & I. J. Co.	75
Manning, Maxwell & Moore	57	Pittsburgh I. & S. Eng. Co.	31	Smythe, S. R. Co., Inc.	30	White Mfg. Co.	10
Marville Machine Co., E. J.	59	Pittsburgh Mfg. Co.	44	Sommer's Son, John.	113	White Mt. Freezer Co.	65
Marfield, H. H.	57	Pittsburgh Reduction Co.	64	Southwark Foundry & Machine Co.	36	Whitlock Coil Pipe Co.	34
Mar & Beekley.	55	Place, Geo.	58 & 60	Spaidel, J. G.	55	Whitlock, Wm.	50
Mar, J. & Son.	38	Plumb, Fayette R.	77	Speirs, J. C. & Co.	25	Whitman & Barnes Mfg. Co.	72
Mar Regulator Co.	109	Plume & Atwood Mfg. Co.	2	Spencer's I. S. Sons.	27	Whitney, A. R. & Co.	24
Mar Foos & Co.	69	Plymouth Mills.	15	Springfield Brass Co.	38	Whitney, A. & Sons.	22
Mar, Ingram & Co.	1	Pollock, W. B. & Co.	35	Springfield Emery Wheel Co.	56	Whitton, D. E. Mch. Co.	50
Mar, H. & Hegeler Zinc Co.	26	Poole, Robt. & Son Co.	37	Standard Fdry. & Mfg. Co.	27	Wickwire Bros.	7
Mar, H. H. Co.	74	Pope Mfg. Co.	65	Standard Horse Shoe Co.	94	Wilcox & Howe Co.	92
Mar Co.	48	Popping, J.	43	Standard Lighting Co.	79	Wiley & Russell Mfg. Co.	49 & 110
Mar Mfg. Co.	87	Port Chester Bolt & Nut Co.	101	Standard Steel Casting Co.	110	Wilhelm & Co.	31
Mar Mfg. Co.	13	Porter, H. K.	82	Standard Tool Co.	52	Wilkie, Bothwell & Co.	31
Mar Mfg. Co.	4	Portsmouth Wrench Co.	92	Standard Tool Co.	67	Williams, J. H. & Co.	96
Mar Mfg. Co.	90	Pottstown Iron Co.	20	Stanley Rule & Level Co.	109	Williamson, C. T. Wire Nov. Co.	109
Mar Mfg. Co.	66 & 110	Pottsville Iron & Steel Co.	17	Stanley Works.	65	Williamsport Wire Rope Co.	6
Mar Mfg. Co.	20	Powell Planer Co.	45	Stark Mch. & Tool Co.	43	Wilmot & Hobbs Mfg. Co.	1 & 3
Mar Mfg. Co.	101	Pratt & Whitney Co.	51	Starrett, L. S.	73	Wilson, E. H. & Co.	18
Mar Mfg. Co.	46	Prentiss Tool & Supply Co.	58	Steam Gauge & Lantern Co.	84	Wilson, John.	74
Mar Mfg. Co.	18	Prentiss Vise Co.	67	Stearns, E. C. & Co.	64	Wilson, J. Fred.	102
Mar Mfg. Co.	72	Pullman, J. Wesley.	23	Stearns Mfg. Co.	86	Wilson, W. A.	45
Mar Mfg. Co.	23	Pullman Sash Balance Co.	91	Steel & Iron Improvement Co.	64	Winslow, Sm'l, Skate Mfg. Co.	80
Mar Mfg. Co.	4	Q & C Co.	13	Steptoe, J. & Co.	90	Wire Goods Co.	6
Mar Mfg. Co.	80	Queen Anne Screen Co.	80	Sternbergh, J. H. & Son.	102	Wister, Francis.	27
Mar Mfg. Co.	50	Queen A. D.	50	Stevens Arms & Tool Co.	85	Wister, L. R. & Co.	22
Mar Mfg. Co.	1	Queen W. J.	1	Stewart & Baker.	91	Witherow, Jas. P. Co.	30
Mar Mfg. Co.	37	Queen Co.	37	Stiles & Parker Press Co.	41	Wolcott & West.	62
Mar Mfg. Co.	1	Queen Clowes.	1	Stocking, E. B.	6	Wolff, R. H. & Co. Ltd.	5
Mar Mfg. Co.	109	Queen Sons.	109	Stoppard, R.	79	Wollensak, J. F.	72 & 93
Mar Mfg. Co.	91	Queen Ware Co.	91	Storm Mfg. Co.	68	Wood Alan & Co.	18
Mar Mfg. Co.	51	Queen Mfg. Co.	51	Stover Mfg. Co.	92	Wood, R. D. & Co.	27
Mar Mfg. Co.	110	Queen Mfg. Co.	110	Stow Flexible Shaft Co.	52	Wood, W. Dewees Co.	23
Mar Mfg. Co.	54	Queen Mfg. Co.	54	Stow Mfg. Co.	52	Woodruff Mfg. Co.	53
Mar Mfg. Co.	18	Queen Mfg. Co.	18	Stuart & Peterson Co.	86	Woodward & Rogers.	41
Mar Mfg. Co.	8	Queen Mfg. Co.	8	Sturtevant, B. F. Co.	47	Wooster, F. V.	79
Mar Mfg. Co.	13	Queen Mfg. Co.	13	Sun Mfg. Co.	88	Worcester Mch. Screw Co.	102
Mar Mfg. Co.	94	Queen Mfg. Co.	94	Supplee Hardware Co.	100	Worthington, Henry R.	38
Mar Mfg. Co.	61	Queen Mfg. Co.	61	Sweetser, W. A.	98	Wright & Colton Wire Cloth Co.	8
Mar Mfg. Co.	80	Queen Mfg. Co.	80	Swindell, W. & Bros.	30	Wright, Peter & Son.	70
Mar Mfg. Co.	61	Queen Mfg. Co.	61	Syracuse Specialty Mfg. Co.	99	Wrought Iron Bridge Co.	15
Mar Mfg. Co.	61	Queen Mfg. Co.	61	Taintor Mfg. Co.	72	Wurster, F. W. & Co.	110
Mar Mfg. Co.	61	Queen Mfg. Co.	61	Tablet & Ticket Co.	56	Wyman & Gordon.	27
Mar Mfg. Co.	61	Queen Mfg. Co.	61	Talcott, W. O.	40	Yale & Towne Mfg. Co.	54 & 67
Mar Mfg. Co.	61	Queen Mfg. Co.	61			Zucker & Levett Chem. Co.	33

ACME HAMMERLESS No. 1,



32 Caliber, Pocket Size.

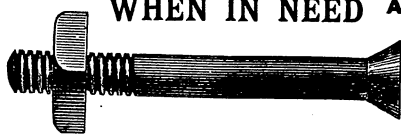
Small, light, durable, low price and thoroughly guaranteed.

A QUICK SELLER.

HULBERT BROS. & CO.,

26 W. 23d Street, NEW YORK.

WHEN IN NEED Address MOUNT CARMEL BOLT CO ,
MOUNT CARMEL, CONN.



WILLIAMSON'S POWER CORK SCREWS.

Turns the Cork out of the bottle.

For Prices and other styles send for Catalogue.

C. T. WILLIAMSON WIRE NOVELTY CO ,

NEWARK, N. J.

Manufacturers of Wire Specialties for the Trade.

MECHANICAL DRAWING.

Progressive Exercises and Practical Hints for the Use of All who wish to Acquire the Art With or Without the Aid of an Instructor.

CONTENTS : Elementary Exercises, Straight Lines and Curves ; Exercises in the Drawing of Non Circular Curves ; The Principles of Projection ; Objects in inclined Positions ; Of the Helix and its Application in the Drawing of Screws ; Intersections and Developments of Surfaces ; Isometrical Drawings, Cavalier Projections, and Pseudo-Perspective ; The Spur-Wheel and the Bevel-Wheel in Inclined Positions ; Construction of the Close-fitting Worm and Wheel ; Construction of the Screw Propeller, Standard Sectioning, etc.

By C. W. MACCORD, A.M., Sc.D. 10 x 12 inches. Cloth, \$4.00.

Sent, post-paid, on receipt of price, by

DAVID WILLIAMS, - - - Publisher and Bookseller,
96-102 Reade Street, NEW YORK.

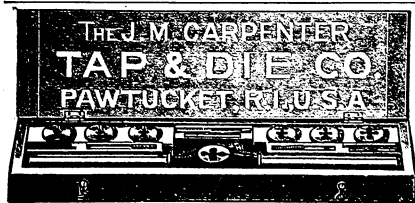
THE W.W.&R.M. KEYS CO.

BRIDGEPORT, CONN.

Bronze, Composition and Brass Castings,
Ingots, Etc.

ALSO MANUFACTURERS OF

BABBITT METALS.



OFFICE OF 1857-1893
CHAS. CARROLL LORING & CO.,
AUCTIONEERS.

EXPERTS, CATALOGUERS, APPRAISERS.

SPECIAL BRANCH :

MILLS, TOOLS, MACHINERY AND MERCHANDISE

272 Franklin St., Boston, Mass.

Sell all over the U. S. Correspondence Invited

KEY TO STEAM ENGINEERING.

Embracing important questions answered concerning the steam engine and boiler.

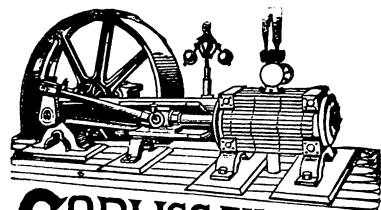
By H. S. WILLIAMS.

174 Pages, 18mo, Cloth, 50 Cents.

Sent post-paid on receipt of price, by

DAVID WILLIAMS, Publisher & Bookseller,

96-102 Reade St., New York.



CORLISS ENGINES
MACHINISTS
IRON FOUNDERS, BOILER MAKERS,
ROBT. WETHERILL & CO.
CHESTER, PA.

NEW MAIL.

10th Year 1893 Model.



SPECIALLY ADOPTED BY
the HARDWARE TRADE.

CUSHION TIRES, - \$105.00.

PNEUMATIC TIRES, - 125.00.

Men's, Ladies' and Boys' Patterns.

SECURE AGENCY.

Also our fine Cheap Wheels—The Best.
MANUFACTURERS:

WM. READ & SONS,
107 WASHINGTON ST., BOSTON, Mass.

AMERICAN WHIPS

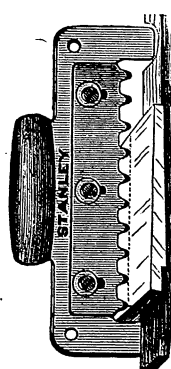
If you sell whips send for price on 10 Americans. our special assortment for hardware dealers. A complete line one lot.

AMERICAN WHIP CO
WESTFIELD, MASS.

Quality is Always

considered in the manufacture of the goods of the Mason Co. of Boston. We compete in price you can buy better will last, is it not? pay a little more? a firm of established and will not output in prices.

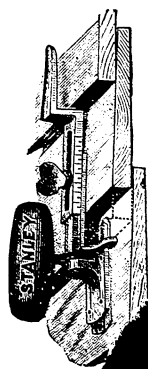
THE



Stanley's Clapboard (Siding) Marker.
No. 88. Wood Handle, Steel Blade.....\$0 50

IMPROVED
Labor-Saving
CARPENTERS'
TOOLS.
STANLEY
RULE & LEVEL CO.
New Britain, Conn.
SOLD BY ALL
Hardware Dealers.

Stanley's Clapboard (Siding) Gauge.
No. 89. Wood Handle, Steel Blades.....\$0 50



PAUL S. REEVES, Philadelphia. Phosphor Bronze

AND

BABBITT METALS.

Lead Lined Car Bearings a Specialty.

Brass and Phosphor Bronze Castings from $\frac{1}{4}$ pound to 20,000 pounds in weight.

STANDARD STEEL CASTING CO.
THURLOW, PA.
STEEL CASTINGS
QUALITY EQUAL TO STEEL FORGINGS

ESTABLISHED
Spring Making, 1842. Steel Making, 1845.
Norway Iron, 1871 (Re-Rolled).

WM. & HARVEY ROWLAND,

MANUFACTURERS OF

Springs, Steel, Re-Rolled Norway
Iron & Slit Norway Nail Rods.

Address FRANKFORD P. O., PHILADELPHIA.

BURGESS & LOXLEY,

Malleable Iron and Small Steel Castings.

MILITARY ROAD & CHANDLER STREET,
BUFFALO, N. Y.

DAYTON
MALLEABLE
IRON CO.
DAYTON, O.
HIGH CLASS
CASTINGS A SPECIALTY.

Y IRON RIVETS.

ALL PURPOSES.

FOR PRICES

TO

RIVET CO.

INDIANA.

LO

STANLEY G. FLAGG & CO., Philadelphia, Pa.
Office and Works, N. W. Cor. 19th St. & Pennsylvania Ave.
Manufacturers of **STEEL CASTINGS**,
A Substitute for Steel and Wrought Forgings.
Circulars Sent on Application.

Barber Improved Brace.

See Page 66.

MILLERS FALLS CO.

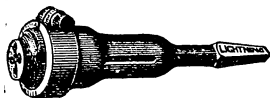
93 Reade St., New York.

EUREKA CAST STEEL COMPANY.

Office and Works, Chester, Pa.

Open Hearth, Crucible and Eureka Steel Castings.
Railroad and Machine Castings.
Locomotive Cross-Heads and Gearing a Specialty.
Guaranteed Knuckles for M. C. B. Couplers.

SPRINGS AND AXLES
ROLLING MILL.
F. W. WURSTER & CO.
375 Kent Ave. Brooklyn N.Y.



Lightning Taps,
Dies and Hold-
ers for Pump
and Carriage
Makers' use.

Send for New Catalogue

Manufactured by

WILEY & RUSSELL MFG. CO., Greenfield, Mass.

STEEL TUBES
WELDLESS
JOHN S. LENG'S SON & CO. NEW YORK.

LIDGERWOOD
HOISTING ENGINES.

800 styles and sizes. Over 9500 in use.

LIDGERWOOD MFG. CO., 96 Liberty St., N. Y.

JOHN SOMMER'S
PERFECTION RED CEDAR
RED FAUCETS
THE GENUINE
MADE IN
FLORIDA
MADE OUT OF SELECTED
THE BEST
CEDAR
(NO LINING)
ONLY THE GENUINE ARE STAMPED
WITH OUR TRADE MARK
MALTESE CROSS
JOHN SOMMER'S SON, M.F.R., 8-12 PEARL ST. NEWARK, N.J.

EXPERIMENTAL ELECTRICITY.

By EDWARD THEVERT.

Illustrated. - Cloth. - \$1.00.

CONTENTS—Some Easy Experiments in
Electricity and Magnetism; How to Make
Electric Batteries; A Galvanometer; An
Induction Coil; An Electric Bell; A
Magneto Machine; A Telegraph Instru-
ment; An Electric Motor; A Dynamo;
Electric Bell Fitting and Gas Lighting;
Electric Lamps; Electric Terms.

WILLIAMS, Publisher & Bookseller,
96-102 Reade St., New York

RUSSELL, BURDSALL & WARD,
Portchester, N. Y.,
Manufacturers of
Carriage, Tire, Plow and Stove
BOLTS

Carriage Bolts made from Best Square Iron a
Specialty.

Solid Steel Castings

From Crucible and Open Hearth.

Steel and Gun Metal Rolls
Specialties.

Air Furnace Refined
Malleable Castings.

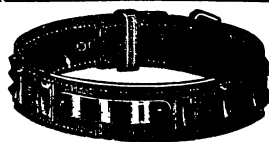
ISAAC C. JOHNSON & CO.,

ESTABLISHED 1853,

SPUYTEN DUYVIL, NEW YORK CITY.

DOG COLLARS,
DOG MUZZLES.

THE
CHAPMAN
MFG. CO.,
Meriden, Conn.

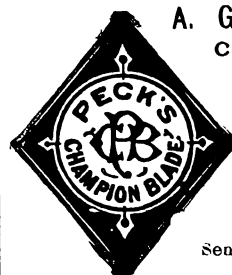


A. G. PECK & CO.
Cohoes, N. Y.

MANUFACTURERS OF

AXES, ADZES
BROAD AXES
HATCHETS.

Send for Catalogue and
Price List.



CASTINGS.

Light Machine and
small gray iron cast-
ings of superior qual-
ity. We have excep-
tional facilities for pro-
ducing fine work.

Prices reasonable.

VAN WAGONER & WILLIAMS CO.

Cleveland, Ohio.

Published by DAVID WILLIAMS, 96-102 Reade Street,
New York. Printed by THE WILLIAMS PRINTING
Co., General Book, Commercial and Newspaper
Printers and Binders, Nos. 96-102 Reade St.
New York.

THE IRON AGE

THURSDAY, AUGUST 17, 1893.

A Loud Telephone.

Many attempts have been made for some time past to construct a telephone which will really talk loud enough for a person in any part of a large room to hear and understand, but hitherto they have all failed with the exception of the "talking apparatus" recently devised by Mr. Graham of the Electric Wiring & Fittings Company, 2 Princes street, Westminster, London, and described in the *London Times*. He has succeeded not so much by an improvement on the existing telephones, although some modification of the apparatus has been effected, as by his method of arranging the circuit and bringing its resistance as low as possible. To this end the usual induction

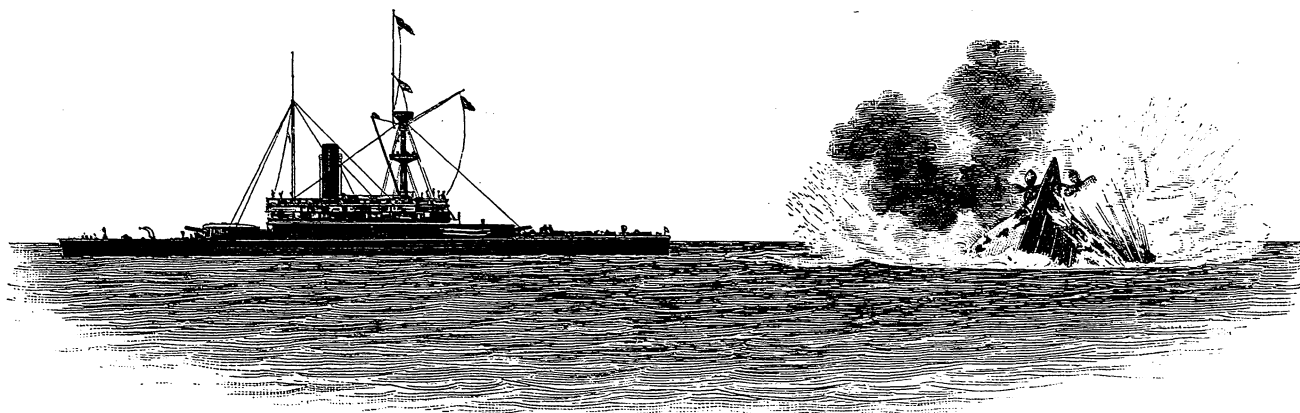
The user has, therefore, no need to listen carefully with one or two receivers held up to his head. All he has to do is speak into his transmitter and keep his ears open. The apparatus is therefore highly convenient, and allows the user freedom of action. It is chiefly intended for domestic service from one part to another of a house, office or workshop, and it will be especially useful on board ship, particularly in men-of-war, or in building yards, farms, newspaper offices and other large establishments.

The Weehawken tunnel of the West Shore Railroad (in New Jersey), which is 4200 feet in length, has been fitted with a novel block-signal system, described in the *Engineering Magazine*, consisting of a line of incandescent electric lamps about 300 feet apart and

Sinking of the "Victoria."

Our readers are familiar with the story of the sinking on June 22 last of Her Majesty's ship "Victoria" by collision with the "Camperdown," during the maneuvering of the Mediterranean fleet off Tripoli. It is not, therefore, necessary at the present time to repeat the account of the disaster.

It is now our privilege, through the kind courtesy of Capt. Cooper Kirton of Valletta, Malta, to present drawings made from photographs showing the sinking of the "Victoria" and the extent of the damage done to the bow of the "Camperdown." The first is from a photograph taken by Staff Surgeon Collot of Her Majesty's ship "Collingwood." It shows that the final plunge



From a Photograph by Staff Surgeon Collot of H. M. S. "Collingwood."

THE SINKING OF THE "VICTORIA."

coil is discarded, and the two instruments, transmitter and receiver, are directly connected in circuit with the line and the battery. The transmitter of A at one end of the line is connected to the receiver of B at the other end. As this arrangement only permits of A speaking to B, and not of B replying to A without a change of the connection and a substitution of apparatus, two separate lines are employed having a common return wire. On the second line the transmitter of B is directly connected to the receiver of A. The two correspondents can thus talk quite freely with each other, and as the receivers speak out so as to be heard in any part of a room conversation can be carried on by each person simply speaking to his transmitter. This apparatus is attached to flexible conductors and is held in the hand. To open a conversation it is sufficient to pick up the portable transmitter and press a button in its casing so as to establish the circuit, then speak into it. The receiver at the other end acts as its own call-bell by the loudness of its voice, and the response comes equally prompt and loud.

placed on a level with the eye of the engine driver. When the lamps are all alight it is an indication of safety; each train passing through extinguishes the lamps for a distance of 1100 feet in its rear, a result which is automatically effected by an electrically connected track circuit, whereby the lamps are kept under the continuous control of the train. The operators in the signal towers at each end of the tunnel can also extinguish the lights in any section of the tunnel if occasion requires. This system appears to embody a number of exceedingly valuable features, and, if successful in practice, cannot but increase the traffic capacity of a long tunnel largely beyond that which is possible by the methods of signaling heretofore in use.

Considerable activity is developing in the oil districts of Peru. English companies in the trade are reported to have acquired tank steamers for transporting the oil to China. It is believed that the whole of the western slope of the Andes, from Colombia down to the southern extremity of Chili, is rich in petroleum.

of the "Victoria" was made in an almost vertical direction, bow down, and that at the time she sank the "Camperdown" had backed away a distance about half her length. On Figs. 2 and 3 is indicated the position of the hole made in the "Victoria" by the bow of the "Camperdown." It will be observed that the opening is very different, as regards both size and location, from what the earlier dispatches led us to believe. It was then stated that the vessels approached each other on lines very much nearer being parallel and that the "Camperdown" struck the other at a point a little in advance of the turret and wedged in behind the side armor to a point nearly amidships. That these statements were erroneous is indicated by the drawings, the location and direction of the break having been ascertained from the officers of the "Camperdown" and the survivors of the "Victoria." On Fig. 2 is indicated the normal water line and also the capsizing water line. The other engravings are from photographs taken of the "Camperdown" after she had been docked; they indicate very clear

the extent of the damage done to her bow and the attempts that had been made by divers to close the opening by means of wedges and plates.

We quote as follows from a letter from Captain Kirton :

When the "Victoria" was first commissioned, one of our best fighting officers remarked that, had he to engage her, he would direct all his quick-firing guns at her unprotected ends, riddle the water line, when, as soon as the water flooded the protective deck, she would, with her low freeboard, inevitably capsize. This common sense view of her stability has been borne out by the facts, for with only half of her protective deck flooded the ship has capsized.

The general opinion is that the cause of the "Victoria's" loss was water-tight doors left open. This is entirely untrue, for the closing of the water-tight

even keel, when the boats of the fleet would have had plenty of time to have saved all hands, even to the last man, the gallant and lamented Admiral.

What actually occurred was as follows, and I am afraid quicker than I can write it : Directly "Camperdown" tore out her ram, "Victoria" took a list to starboard, the bow drooping. When she was started for the beach, being down by the head to commence with, she began to bore forward and tip aft. The protective deck was rushed full up, the end of main deck filled, the dip and list rapidly increased, until she, losing the stability of her full after water line, was floating upon what might be termed a raking transverse section, a position of utter instability, when over she went. The final plunge was, I may say, instantaneous.

So little idea had the people in the engine room of such a catastrophe, that

Upper part of stem crushed in, making an opening of about 15 feet long by 10 or 11 feet wide; the plates on port side were crumpled up like paper. This side suffered most, a large hole, 9 by 10 feet, being ripped out, commencing at break of stem and running aft just above protective deck. The frames showed the effects of the first blow and subsequent dragging clear and were twisted out of recognition. The ram was practically uninjured and could have rammed another vessel. It was all wrought work, no casting, and admirably strengthened by heavy horizontal ram plates. This ship will be thoroughly repaired and be afloat early in September.

The defect in bows and rams as at present constructed is that they are supposed to ram and rip up a vessel under water, the bow above not being affected. Instead of which the vessel

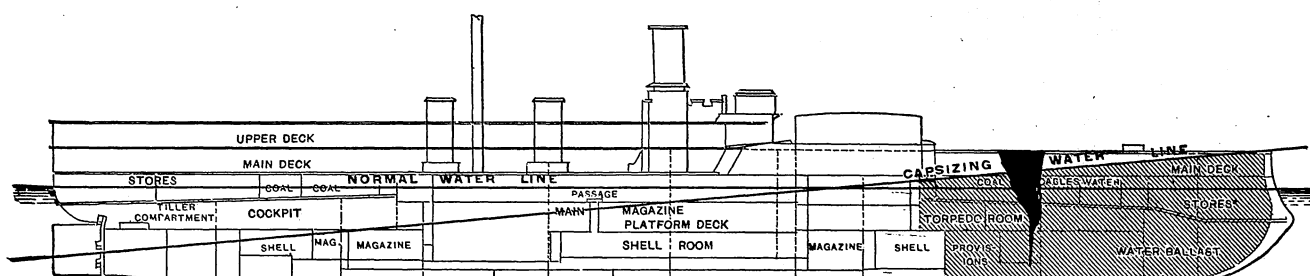


Fig. 2.—Vertical Longitudinal Section of the "Victoria."

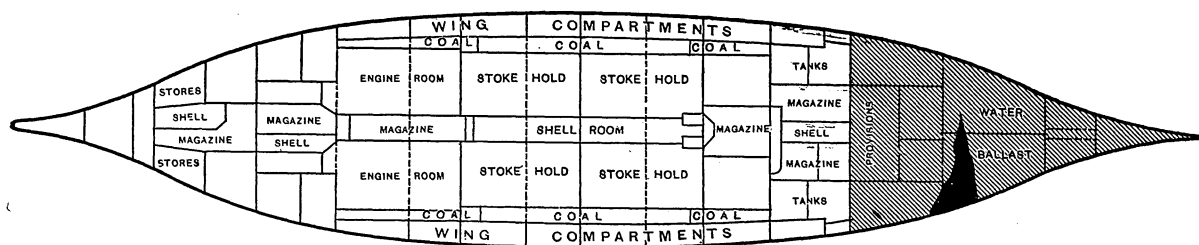


Fig. 3.—Sectional Plan of the "Victoria," Showing Hole Made by "Camperdown's" Bow.

THE SINKING OF THE "VICTORIA."

doors hurried the loss of the ship and lost us a large number of valuable lives. This particular statement I will proceed to prove.

When, after the collision, Admiral Tryon found that the engine rooms and stoke holds were intact, the water-tight doors closed, and over three fourths of his ship sound, he countermanded the boats of the fleet and headed the ship for the shore to beach her. He thought he had a ship under his feet, not a death trap, and his men were so impressed with the notion of unsinkableness that many when warned refused to come on deck. The whole of the engine room staff on watch perished to a man, busy driving the ship to shore, and expecting to get there.

Now we will change the scene. We will suppose, that this vessel had not been in the state of magnificent discipline that she was, that the crew had rushed for the deck, leaving the water-tight doors to take care of themselves. The consequences would have been, stoke holds and engine rooms flooded, the ship would have been stopped, would have commenced to sink on an

a few moments before she turned over the engineer sent an artificer on deck to know why they were letting go the anchors when the ship was steaming ahead, this letting go the anchors being the cables running out through the vessel's bottom, she having been cut right into to the chain locker.

The lesson to be learned from this appalling calamity is, that should another of these costly coffins be struck in the same manner the only way to get her beached would be to lock the helm amidships, tell off a vessel to make fast to each quarter, and tow her in stern first.

The "Camperdown's" ram struck "Victoria" nearly at right angles, say about 80°, and cut nearly into her middle line just as if she had been made of cheese. So much for ramming. The feeling aboard "Camperdown" was as if they were cutting into a soft sandbank; there was no jar felt, and the engines worked afterward as if nothing had happened.

The damage to "Camperdown" was stem 15 by 5 feet broken short off above ram and turned to port 18°.

built for ramming cuts into another so easily that she never stops until choked off by the crushing up of her own topsides. Nothing, not even the strongest ironclad that was ever built, could withstand ramming; the thickest armor would be simply driven in.

The damage to "Camperdown" shows that the stem above the ram ought to be worked thicker and deeper and the plating made thicker, so that the stem would take the blow, and the edge of plating be covered. The stem plating of "Camperdown" was simply sheared off for want of this precaution. The stem and frames should also be backed by heavy stringers capable of wedging into any ordinary topside without much damage to the rammer.

The Chicago, Rock Island & Pacific Railway Company announce that they have extended the "Rock Island route" to Fort Worth, Texas, and are now in a position to transport freight of all kinds to and from all points in Texas. Arrangements have been perfected for first class freight service.

A New Chicago Cable Line.

The cable was started recently on Blue Island avenue, Chicago. The arrangement of the new Blue Island line is as follows: One cable rope runs from the power house at Twelfth street and

street on Twelfth street east to Halsted, south on Halsted to O'Neil, back north on Halsted to Blue Island avenue, back on Halsted to Twelfth street and to the power house through the conduit. All these cables will be run from the power house at Blue Island avenue and Twelfth street. The down-town loop through

used for steaming. Walker differential drums are installed, together with Walker friction clutches, which will allow any one of the cables to be stopped without interfering with the speed of the engines. There is a spare set of drums, so that in case of accident to any of the three cables the extra one

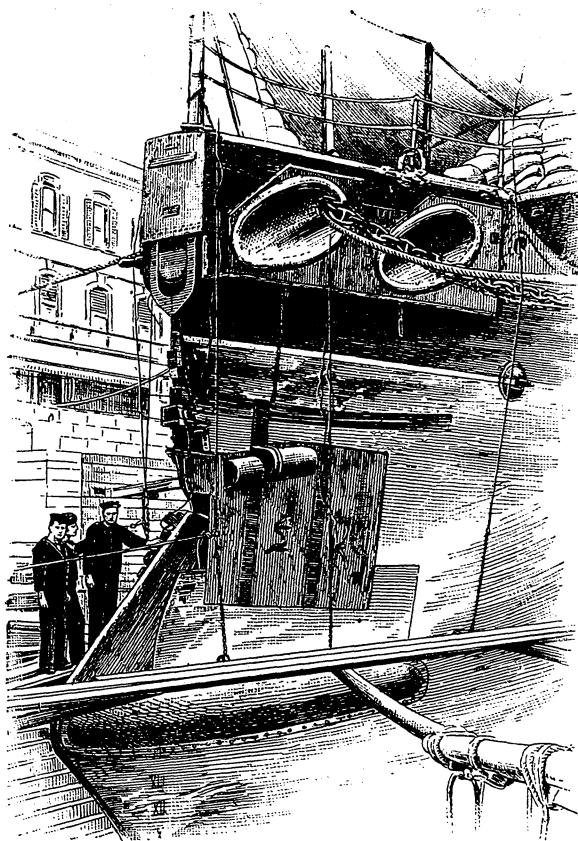


Fig. 4.—"Camperdown's" Bow, Showing Plates Put on by Divers.

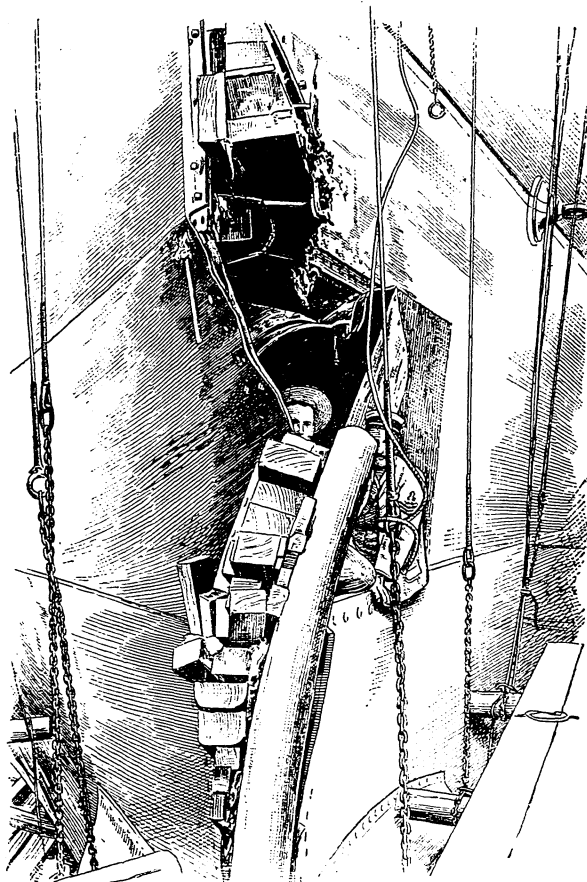


Fig. 5.—Front View of "Camperdown's" Bow with Wedges to Partly Fill the Hole.

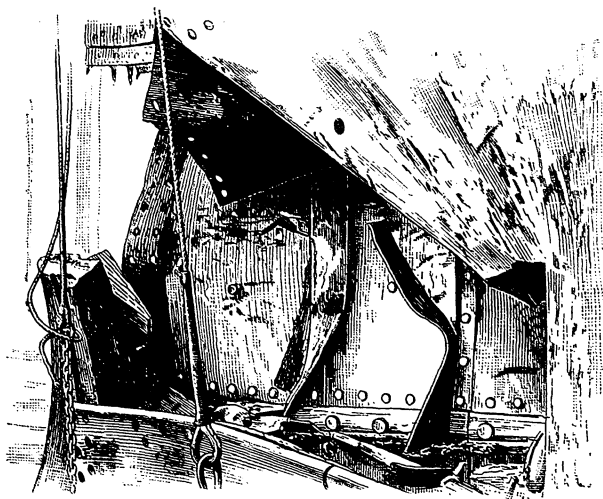


Fig. 6.—"Camperdown's" Bow with Plates Removed.

THE SINKING OF THE "VICTORIA."

Blue Island avenue out Blue Island to Western avenue; another runs from this power house up Blue Island avenue to Halsted and Van Buren streets and thence to the power house at Van Buren and Jefferson streets. There is also what is called a dead cable that runs in conduit or tunnel from the power house at Blue Island avenue and Twelfth

the Van Buren street tunnel will be run from the power house at Van Buren and Jefferson streets.

The power house at Blue Island avenue and Twelfth street, which will furnish such an enormous power, is equipped with two 1000 horse-power Allis Corliss engines, two batteries of boilers, four in each, in which oil is

may replace it. The plant is provided with two 25 ton cranes with travelers, so that in case of accident or for repair purposes any piece of the ponderous machinery may be readily lifted out of place.

The South Blue Island avenue cable, which runs from this power house to Western avenue, is 27,000 feet in length; that north on Blue Island avenue 12,000 feet. The basement of the power house, which contains the tension drums for stretching the cables, has also a complete electric light plant, by which the building is lighted. Both power houses were built by the Pennsylvania Iron Works of Philadelphia. The Halsted street lines will soon be in use. For the present, and until the down-town loop is put in, trailers will be detached from the grips at Van Buren and Jefferson streets and will make the down-town trip by horse-power by way of Van Buren, Dearborn, Adams, Franklin and Van Buren streets, back to connect with the cable at Van Buren and Jefferson streets.

According to a recent statistician the United States produces 2220 pounds of grain to each inhabitant; Denmark, 2205; Canada, 1500; Russia, 1200; Roumania, 1150; Spain, 1100; France, 990; Sweden, 980; Argentine Republic, 750; Australia, 760; Germany, 700; Belgium, 600; Portugal, 550; Ireland, 500; Scotland, 490; England, 360.

Rod-Rolling Mills and their Development in America *

BY FRED. H. DANIELS, WORCESTER, MASS.

(Continued from page 252, August 10.)

We now come to that period in the history of rod rolling in the United States where the development has been so rapid and the production so increased as to astonish even the most sanguine of our rod rollers, and I am sure it will surprise our friends from abroad when they learn what is now accomplished.

There are practically only two systems in use in America at the present time: 1, the combined back-and-forth and looping system, requiring expert roughers and catchers for all the oval passes and repeaters for square passes; and, 2, the continuous system, which is almost wholly automatic throughout its operation—that is, dispenses largely with hand labor. By the first system is produced two-thirds of all the rods rolled in this country, and the

45,000 tons. Other mills were erected in the following order:

	Year.	Tons.
Cleveland Rolling Mill Company, first mill.....	1882	45,000
Hartman Steel Company.....	1883	60,000
Oliver & Roberts Wire Company.....	1884	60,000
Braddock Wire Company.....	1885	45,000
American Wire Company.....	1886	60,000
Joliet Steel Company.....	1889	50,000
American Wire Nail Company.....	1890	45,000
Newcastle Wire Nail Company.....	1891	45,000
Iowa Barb Fence Company.....	1891	45,000
H. P. Nail Company.....	1891	45,000
Kilmer Mfg. Company.....	1892	30,000
Cleveland Rolling Mill Company, second rod mill.....	1892	30,000
Pittsburgh Wire Company.....	1892	40,000

Total annual capacity..... 610,000

	Pounds.
Maximum output in one turn, Beaver Falls, No. 3 rods.....	349,460
Maximum output in one turn, Joliet, No. 4 rods.....	342,620
Largest single turn, No. 5, Beaver Falls.....	322,000
Largest single turn, No. 5, Joliet.....	314,000

	Gross tons.
Largest year's work, Joliet, 1891.....	56,769
Maximum output, No. 3, in double turn, ten hours each, Beaver Falls.....	277

tity in 1892, Ohio second, Massachusetts third, and Illinois fourth. Nearly two thirds of this entire output of wire rods was consumed in the manufacture of barbed wire fencing and wire nails.

Probably no one in the United States has overcome more obstacles in rod rolling than William Garrett. Commencing with an output of 70,000 pounds in ten hours, the Garrett mill now produces as high as 349,000 in the same time. This has been brought about by being constantly on the alert to increase the output every time the possibility of producing this result presented itself. Shortly after adopting the power reel, Mr. Garrett conceived the idea of finishing two rods simultaneously and reeling them on independent power reels. This innovation was a complete success, and to-day it is the common practice to finish as many as five at a time, the mill, of course, being supplied with five or six reels for coiling the product. In addition to the increase in product by multiple rolling, Mr. Garrett quickly perceived the advantages of the McCallip repeater for conducting the first end of

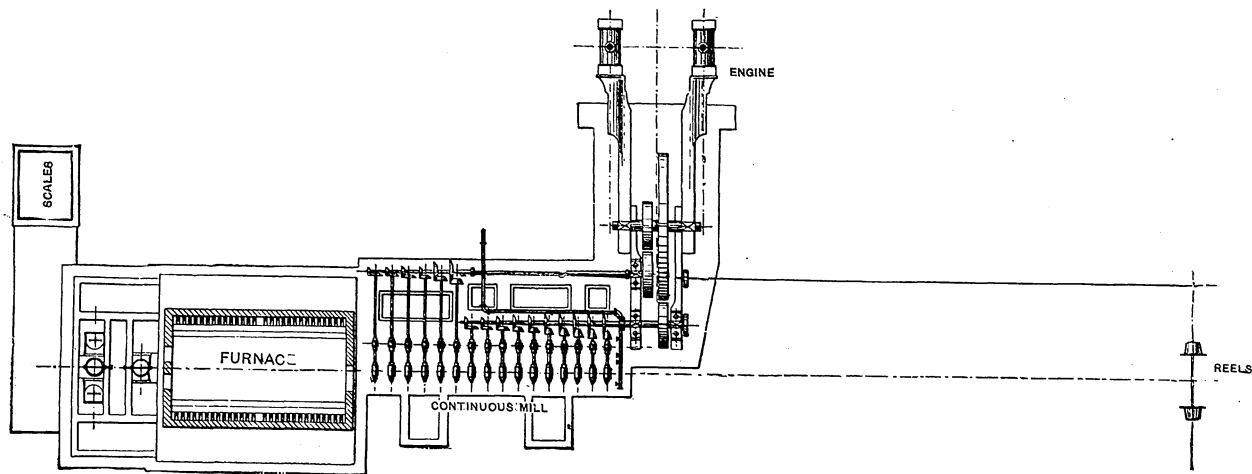


Fig. 12.—The C. H. Morgan and F. H. Daniels Continuous Rod Mill.

ROD-ROLLING MILLS AND THEIR DEVELOPMENT IN AMERICA.

credit for its development to the position of largest producer of wire rods belongs to William Garrett. The credit of the introduction into America of the second system or continuous method of rolling belongs to the late Ichabod Washburn. The credit for its development afterward must be divided among the engineering corps of the Washburn & Moen Mfg. Company, Chas. H. Morgan and the writer having taken a somewhat prominent part in such development. Of course, there are mills which vary in a slight degree from the two systems, but in all cases the difference consists chiefly in combining the parts of the rolling mill plant, so that they are arranged to accomplish the same results by substantially the same mode of operation.

The Garrett rod mills, Fig. 13, were introduced very rapidly as soon as the successes attained by Mr. Garrett were made public. The first mill was erected in 1882 by the Cleveland Rolling Mill Company, the annual capacity being

Maximum output, No. 4, in double turn, ten hours each, Joliet.....	307
Maximum output, No. 5 and coarser, in one month, Beaver Falls.....	5,724
Maximum output, No. 5 and coarser, in one month, Joliet.....	5,462

The rod-rolling capacity of the United States I estimate as follows:

	Gross tons.
Garrett system, running at maximum capacity.....	650,000
Continuous system, running at maximum capacity.....	250,000
Other forms of mills, running at maximum capacity.....	100,000
Total.....	1,000,000

Although the above figures are undoubtedly a conservative estimate of the annual capacity of the rod rolling mills in the United States, we have not been able, up to date, to actually obtain this output, on account of the inability to continuously run rod-rolling mills throughout the year. Repairs and other stoppages largely curtail the maximum output. Mr. Swank of the American Iron and Steel Association, in his last report, places the total production of wire rods for the year 1892 at 627,829 gross tons, against 536,607 tons in 1891, an increase of 91,222 tons. Pennsylvania made the largest quan-

the square section from one groove to the next, thereby dispensing with about one-half of the catchers, reducing the cost of rolling, and increasing the efficiency and output of the mill, also permitting an increase in weight of billet to 150 pounds. The writer was well acquainted with Mr. McCallip and saw the repeater in operation at Columbus, Ohio, in a mill of which Mr. McCallip had charge, and Mr. McCallip deserves the credit of having invented the device which has had more to do with the development of the looping system of rod rolling than any other. There have been several devices suggested by others to accomplish this result, but to-day the McCallip repeater is the one in general use in the United States on all looping mills. McCallip's patent was taken out October 23, 1877.

Automatic reeling was used experimentally at the works of the Washburn & Moen Mfg. Company as early as 1879, and put in successful and constant operation in 1886, and is now exclusively used in all wire rod rolling mills in this country. As the maximum output of all rod-rolling mills depends, of course, upon the capacity of the reeling apparatus, the old-style reeling appara-

* Presented at the Chicago meeting (August, 1893) of the American Society of Mechanical Engineers, and forming part of Volume XIV of the *Transactions*.

tus—that is, the power reel and the large iron floor—will now be explained more fully by the following example: In 1878 the wire rods rolled by the Washburn & Moen Mfg. Company were the product of a continuous mill—that is, a rolling mill made up of a number of pairs of rolls, so arranged that the hot billet passed from the first to the second, from the second to the third, and so on. As the billet was reduced in cross sectional area by each pair, it was necessary to give the second pair a

an attendant set the reel in motion and rapidly quickened its speed until the loops of the hot iron rod were taken off the iron floor, and the hot rod extended in a long sag from the reel to the final pair of rolls, when the speed of the reel was carefully regulated to take the rod about as fast as it was delivered by the final pair of rolls. This reel can be well named a traction reel; that is, it pulled the hot rod first from the iron floor and then kept it under strain between itself and the final pair of rolls. In this and

limits of speed of the final pair of rolls, and the former limitations as to the number of rods have disappeared; for the iron floor and traction reels are abolished, and the automatic reels can be set so near the final pair of rolls that the hot rod passes directly into the reel while the reel is revolving rapidly.

(To be continued.)

WORLD'S FAIR NOTES.

The Ferracute Machine Company,

of Bridgeton, N. J., have a large exhibit of their presses, spinning lathes, and other sheet-metal machinery, as well as a number of dies, at the Columbian Exposition. They are located in the center of Machinery Hall Annex, columns I, J, 42. Their space is about 30 feet square, and they have a small auxiliary space on the center aisle also. They show two large drawing presses, a large double-crank press, three of their new style of C presses, two punching presses and a number of foot, screw and drop presses, two spinning lathes, braders, threaders, crimpers, &c., in operation daily. They are manufacturing a number of small goods in aluminum, brass and tin, thus illustrating the working of the presses to the best advantage. All of these presses are from their latest designs and with a number of improvements in the way of new clutches and adjustments, convenient clamping arrangement for setting dies, &c. Their exhibit is driven from a line of shafting of their own, and an independent upright engine gives them their motive power.

There are a number of dies in operation which are of special interest to the sheet-metal trade, in the manufacture of cups, plates, pans and small fancy goods. They also show one of their coining presses and one of their embossing presses, which are adapted for medals, badges and fancy work of various kinds. They also show on their wall space a great variety of articles in sheet metals which have been manufactured in their presses and dies. Among these may be specially noted sheet metal shingles in numerous patterns and shapes, a variety of vessels showing deep drawing and stamping, cans of many sizes, fancy metal boxes, sheet metal ornaments, &c. Towering above the exhibit is a revolving vertical shaft, on which are two great signs at a right angle with each other, bearing the name of the company and attracting attention to the display.

They have a neat office fitted up in connection with their space, and will be glad to welcome any one in the metal-working trades at any time. Mr. Hoffman, foreman of the press department, is in charge of their exhibit, and Mr. Stevenson is in charge of the dies, running presses and manufacturing the sheet metal goods. Their whole exhibit is a very interesting one.

They are about to issue a new catalogue describing their new lines of presses.

The Peck, Stow & Wilcox Company,

27 Chambers street, New York, whose factories are at Southington, Plantsville and East Berlin, Conn., and at Cleveland, Ohio, make a fine exhibit of tanners' machines and tools in Machinery Hall, column A 51. The machinery shown comprises an 8-foot square shear for foot power, a 31-inch square shear for foot power with auto-

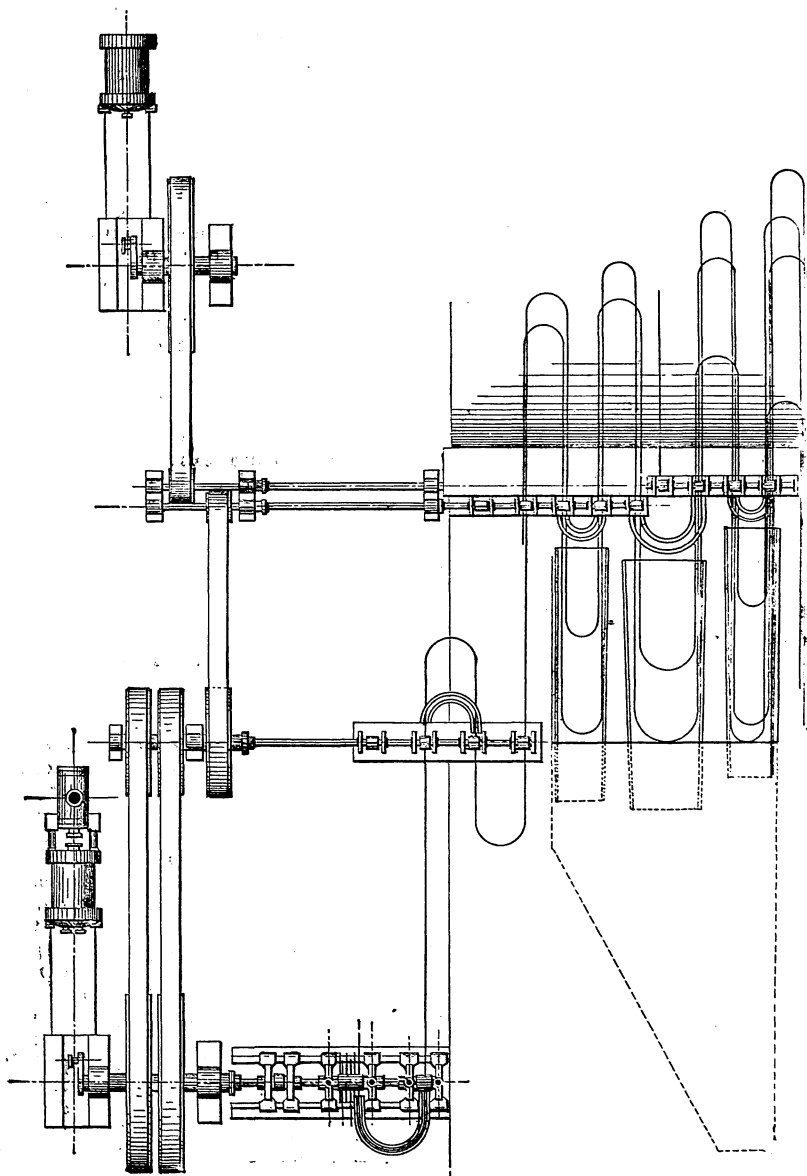


Fig. 13.—The William Garrett Rod Mill.

ROD-ROLLING MILLS AND THEIR DEVELOPMENT IN AMERICA.

surface speed much greater than the first pair; and the third pair a still greater surface speed; the final pair requiring a surface speed of almost 30 feet per second—faster than a mile in three minutes.

The first end of the hot wire rod issued from the final pair of rolls over a large floor of iron, and the wire rod, as it issued from the rolls, was flirled in loops over one side of the iron floor, when a nimble attendant ran upon the floor, seized the first end with his tongs and thrust it through a hole in a screen of plate iron and between the fingers of a reel. As soon as the first end of a hot wire rod was connected with the reel,

all other traction reels, the speed of the reel must be regulated with great nicety during the whole operation. With this system of rolling, 600 revolutions was the maximum speed in continuous mills, rolling one rod, and 450 revolutions on the looping system, rolling two rods.

In order to increase the output the speed of the final pair must be increased or the number of rods rolled at the same time must be increased. The first is practically impossible, because the traction reel is not adapted for any greater speed, and the second is objectionable because it requires a traction reel with its large floor for each rod. With the automatic reel the former

matic clamp and double edge blades, a machine for cutting and folding tin or sheet metal for map binding, a 3-inch roll former with slip roll and duplex compensating gearing, a 2 inch slip roll former with compensating gearing and quick roll adjustment, a beader, 30-inch groover, rim machine, stake holder with stakes, incased machines, Columbian machines, 20-inch folder with quick-moving gauge, 30-inch folder with square box attachment, bench scroll or slitting shear, right and left hand ratchet drill, and flat and round nose and side cutting pliers. They also show the Little Giant and Triumph meat cutters. The small tools are shown attached to benches of hard wood, in position for operating. A large showcase contains fine specimens of small tools of the company's manufacture, comprising ratchet bit braces, pipe pliers in a variety of sizes, an assortment of pincers, auger bits, draw knives, bevel-sided chisels, wire pliers, compasses in great variety, hatchets, tinnern's and other hammers, and Robinson's wrenches in all sizes.

Swarts Iron & Metal Company,

551 to 557 State street, Chicago, make an interesting exhibit in the southwest corner of the gallery of the Mines and Mining Building. It consists of a showcase of samples of scrap iron and steel and other metals, representing the manner in which they are classified for the market. The samples are arranged in trays and are appropriately labeled, as follows: Mixed steel scrap, No. 1 small mill scrap, No. 1 forge scrap, stove plate scrap, No. 1 cast scrap, borings, railroad spring steel, turnings, mixed scrap as brought to the yard from the country, scrap lead, copper wire, battery copper, battery zinc, scrap zinc, heavy brass, copper dross and brass borings. In connection with this collection of raw material samples are shown of the iron product, consisting of muck bar and round and flat bar iron. In a vertical case they also show, appropriately labeled, samples of No. 1 small mill scrap, horseshoes, files and tool steel, borings, turnings, burnt cast scrap, old steel rails, &c. Not far from this exhibit stands an oak pedestal supporting a glass case in which is shown the

First Casting Made in America,

the small iron pot, cast at Lynn, Mass., in 1643, at the Saucus Iron Works, and presented to the city of Lynn by John E. Hudson, a descendant of Thomas Hudson, the owner of the site of the iron works, to whom this first casting was given. A photograph of the site of the foundry is also shown. Another very interesting exhibit in this part of the gallery is found on the wall. It is a display of tubes manufactured at the

Ellwood Ivins Tube Works,

528 North Tenth street, Philadelphia. These are seamless tubes, made of various kinds of metal, such as steel, brass, copper, German silver, aluminum, aluminum bronze, &c. The sizes shown run from 2 inches down to almost the diameter of a hair; but the statement is made that larger sizes can be furnished as desired, and of any commercial metals. All are made without solder, seam or weld. A peculiarity of the process is that the walls of the tube can be made of any thickness desired, so that the tubes will be heavy with small calibers or very light with merely walls of shell. They are guaranteed true and accurate, even the smallest sizes being made accurate to the thousandth

of an inch. The exhibit is a remarkable one and worthy of a more conspicuous position. No description of the process employed is given in connection with the samples shown.

The Kilbourne & Jacobs Mfg. Company

of Columbus, Ohio, have two exhibits, one being composed of trucks, wheelbarrows, &c., in Transportation Building, section A-12, and the other being devoted to wrought steel sinks, in the Manufactures Building, section N, block 4. The exhibit in the Transportation Building consists of a large variety of warehouse and store trucks, barrel trucks, cotton trucks, and baggage trucks, to meet any requirement, the warehouse and store trucks being of different patterns to conform to the peculiarities of the trade in different cities; box trucks, consisting of a heavy frame on casters, for moving boxes and other bulky freight; the Little Giant truck, for handling light packages; stove carriers, which can either be used as trucks or for carrying stoves from one location to another; book and paper house trucks, wire-nail wagons, barrel trucks, sheet-metal trucks, machine-shop wagons, and a great number of special trucks for a variety of purposes. There are also hand carts, with and without springs, in numerous styles. The Boss solid steel drag scraper and the Columbus steel ditching scraper are among other products displayed, as well as wheel scrapers. Very heavy contractors' plows are shown, while the line of wheelbarrows exhibited comprises an unusual variety of these useful articles, adapted to about every form of work to which a wheelbarrow can be put, including charging barrows for blast furnaces. The exhibit in the Manufactures Building shows the Columbus wrought-steel sink, enameled in different colors. It is also furnished galvanized or painted. These sinks are each made from one plate of steel, pressed into the proper shape, and are thus not only seamless but are very light, strong and durable, as they will not break in shipping or handling, nor from exposure to sudden heat or cold. The bowl and projecting thimble are stamped in one piece from the same plate, enabling the strainer and pipe to be satisfactorily attached. The company have their own coupling to connect the pipe to the sink, which is not only simple but is stated to be thoroughly reliable, avoiding all leakage.

Randolph & Clowes

of Waterbury, Conn., having branch offices in New York, Philadelphia, Boston, Cincinnati and Chicago, have two exhibits. One in Manufactures Building, section N-62, is devoted to Brown & Bros. patent seamless drawn copper range boilers, of which this firm are sole manufacturers. These boilers are shown mounted on boiler stands, and are beautifully finished, being polished until they look like gold. One of the boilers has been cut in two, vertically, to show the interior construction as well as the uniformity in thickness of the shell. A spiral rib runs round the interior of these boilers their entire length, stiffening the shells and supporting them so that the firm guarantee that they will not collapse. Some of the boilers are nickel plated. The exhibit is a fine one, rendered more attractive by the well-finished hard wood floor and the elegant brass railing inclosing the space. The exhibit in the Mines and Mining Building is in the

east central section, and is one of the most unique and conspicuous exhibits in the building. They have built a pavilion some 25 feet square and 18 feet high, with walls composed wholly of seamless tubing of different diameters running from large tubes on the corners to small ones in the centers. These tubes are of copper, bronze and brass, arranged regularly in that order, making an alternation of colors. On the top of each corner is a dynamite shell, such as were made for the "Vesuvius," dynamite cruiser. Ornamental panels of brazed tubing are arranged in various places about the upper part of the pavilion, also highly polished specimens of copper bottoms, sections of distillers' coils for worms, &c., attached to sheets of planished copper. Inside the pavilion is a rack composed of R. & C.'s patent beer-cooling tubes, which supports a number of spun brass and copper kettles of different sizes. On a large table extending along one side of the inclosure are shown a great variety of the firm's products in sheet brass, German silver, sheet copper, &c. Among the goods shown are brass moldings of new design, and specimens of the new R. & C. brass plumbers' ferrules, made by an entirely new process, to take the place of the old cast ferrule and thus save plumbers much time and labor. They are made perfectly smooth, exact to size, and are carefully tested by hydraulic pressure to 500 pounds to the square inch. Some are plain and others have the ends tinned ready for instant use. The space about the pavilion is inclosed by brass chains attached to posts composed of dynamite shells set on end. The brass signs used on these exhibits are unusually wide specimens of sign brass, being 42 inches wide.

The Sellers Gun Furnace.—A Washington despatch of August 10 reports that the parts of the new furnace for assembling heavy ordnance have reached the Washington gun shops from Philadelphia, and will soon be placed in position. The furnace is the invention of William Sellers, the machinery builder, and is intended to prevent the sticking of tube and jacket of great guns while in process of assembling. The naval ordnance officers are awaiting the results of the proposed system with great interest, as it is destined to change the method of assembling. Instead of the jacket being expanded in a pit and then placed over the tube, the tube is inserted in the furnace in a horizontal position, and while the intense heat is applied the tube is forced to its seat. A device is affixed to the tube so that a stream of cold water is applied to the tube as it is being shoved into the jacket. By this system the jacket is not free from the heat of expansion until the tube has been correctly inserted and the possibility of the jacket contracting upon the tube is therefore lessened. The first gun to be assembled by the Sellers furnace will be the nickel-steel gun, the parts of which are ready at the Washington ordnance shops. This is the first nickel-steel weapon, and is intended as an experimental gun to be used at the Indian Head proving ground in testing powder. The gun is of 8-inch calibre. It will be assembled as soon as the pyrometers, used for measuring the temperature in the furnace, are received.

Grain exports from Montreal this season have far surpassed in volume the shipments of any previous year.

Blowing Engines.*

BY JULIAN KENNEDY, PITTSBURGH, PA.

The different types of blowing engines in use are so numerous that it would not be practicable to consider them all in this paper. I shall therefore only take up briefly a few well-known types.

The style of blowing engine most largely used in this country is the vertical engine with air cylinder above, cross head between steam and air cylinders and two fly wheels, each having a wrist pin in its hub or in one arm. This kind of engine can be built cheaply, takes up little room and is very accessible. Its disadvantages are that the cross

Another type of engine which has given good satisfaction is the vertical double engine, having air cylinders above, steam cylinders below them, and cranks at bottom, the engines being coupled to cranks on the ends of the shaft, placed at right angles to each other, the shaft carrying the fly wheel at its center. Engines of this type, except that they are arranged horizontally, are also used to a considerable extent. These engines avoid the disadvantage of having wrist pins in the fly wheels, and also dispense with the long cross head with its attendant disadvantages. They give a very uniform pressure of blast, and are very convenient for starting. The vertical engines of this type, as compared with the horizontal, take up less room, and the wear on cylinders due to carrying

double machine is worthy of consideration.

The double-coupled type of engine is also particularly adapted to compounding. As most blowing engines run under a comparatively constant load, and as the increasing use of water-tube boilers in iron and steel works renders it easy to maintain high steam pressures, I have no doubt that before long compound blowing engines will be adopted in a large majority of the new plants built.

In looking over the different kinds of blowing engines, we cannot fail to be impressed with the fact that in nearly every case the air valves are the weak point in the machine. In the great majority of cases the maximum speed of the engine is about half what it could be if the air valves could work fast

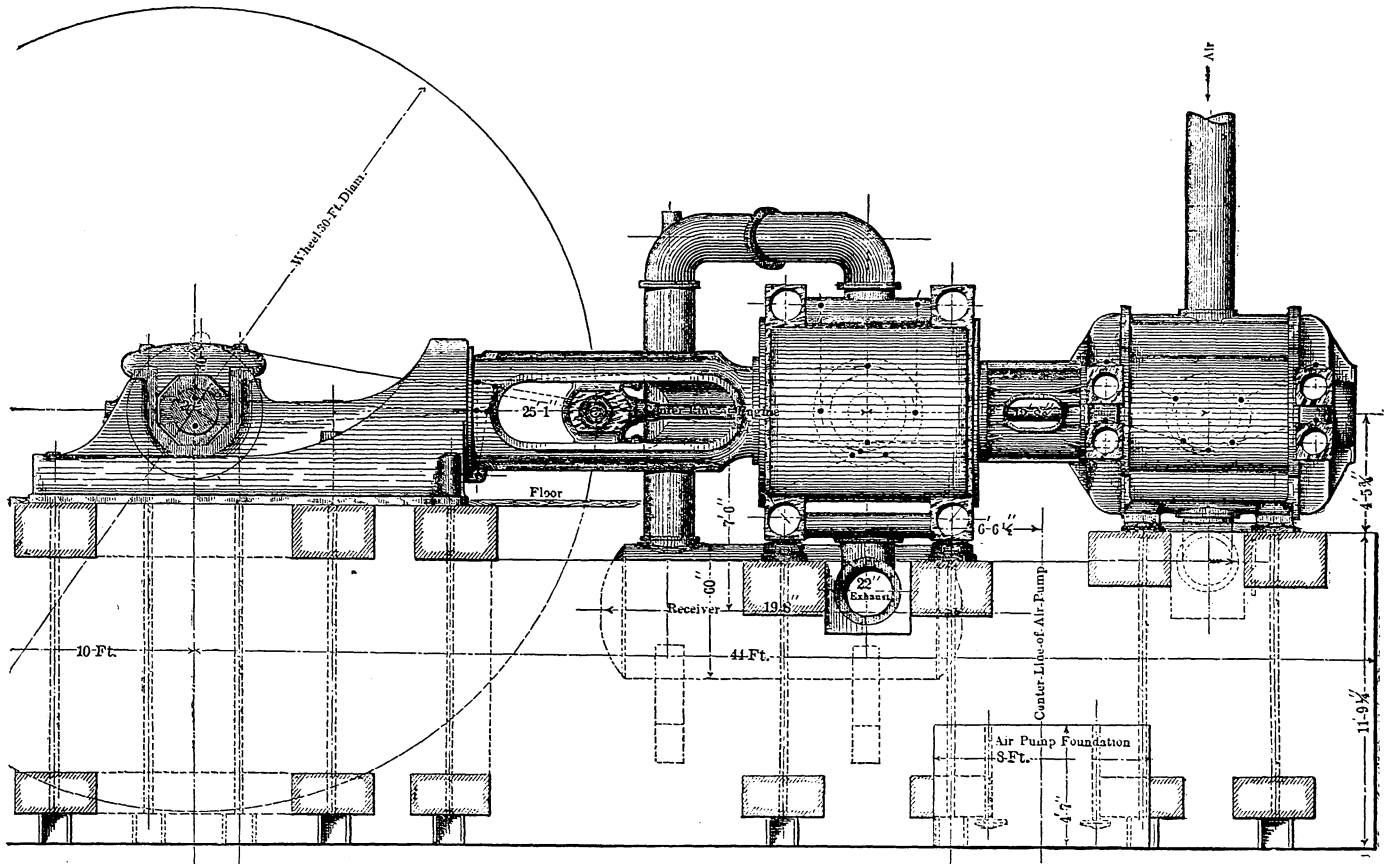


Fig. 1.—Elevation.

BESSEMER BLOWING ENGINE, OHIO STEEL COMPANY.

head is liable to break, and that putting the wrist pins in the wheels tends to set up vibrations in them. It is likely that on the whole this type of engine will continue to be built quite extensively.

The same general arrangement has also been used to some extent, but not widely, in horizontal engines. The Bethlehem Iron Company have some very fine blowing engines of this type, except that they are compound, having the one steam cylinder replaced by two, side by side. These engines are noticeable not only for the very excellent workmanship on them, but also on account of the weight of the pistons being carried by steam pressure applied in chambers in the lower side, the steam being supplied to these chambers through the hollow piston rods. This arrangement, I believe, has always worked well.

* Presented at the World's Engineering Congress, Chicago, before the American Institute of Mining Engineers.

the weight of pistons is avoided. On the other hand, the machine is very high, and there is considerable vibration. The horizontal machine avoids this, is very accessible and is cheaper to construct. With proper attention there seems to be no serious trouble with wearing of cylinders, so that wherever ground room is ample the horizontal double-coupled engine seems to be very suitable. The principal objection urged against this style of engine is that in the event of a break a large machine is disabled, whereas, if two single engines are used, one can keep the works going while the other is being repaired. This is doubtless correct, but I think that too much weight is often given to this consideration. With machines strongly proportioned and carefully built, there should be very few stops; on the other hand, in the case of Bessemer engines, which are starting and stopping at short intervals, the fact that one attendant can handle the

enough. To remedy this fault several plans have been resorted to. In some cases fairly good results have been obtained by making the valves very light, giving them but little lift, and arranging them so that they shall seat by gravity. In some cases valves of this kind are so constructed that the air in entering the cylinder is compelled to pass through a large number of very small openings. This is a very objectionable arrangement, not only on account of the increased amount of friction, but because the air in passing over the metal grids in thin streams will absorb quite a considerable amount of heat from the heads, which, in the case of engines working against high blast pressures, are made very hot by the heat of compression.

This heating of the incoming air expands it and proportionally reduces the weight of air entering the cylinder at each stroke. I have observed this in the case of an engine which was so con-

structed as to cause the air to travel about 3 inches over the hot metal in thin films about $\frac{3}{16}$ inch thick. Alongside of it was another engine of the same size and make, except that valves were used which allowed the air to pass over about 1 inch of metal, the openings being of such size that each stream of air was 2 inches in thickness. Careful and repeated tests of these engines, when both were in good order, showed that, while the indicator diagrams were practically the same, the one with the large valves would burn about 10 per cent. more coke in the furnace: a result which could only be explained on the supposition that, in the case of the engine with small air openings, the incoming air, in passing through the small and tortuous passages in the

building, and to discharge it below the cylinders. The inlet valve is a plain rotary valve held to its seat by the blast pressure, which is admitted to the back of the valve by a port from the discharge chamber, and is driven from a wrist plate. The outlet valve, as will be noticed, is a triple-ported valve, which is closed at the proper time by the wrist plate.

The connection between wrist plate and valve is made by a telescopic extensible rod, which pushes the valve shut, but permits the wrist plate to reverse its motion without pulling the valve open. To the valve lever is attached a vacuum pot, which tends to pull the valve open. When the valve has been closed it is gripped by the receiver pressure acting on the back,

set in pockets at end of the valve. It will be seen from the drawings that these blocks have a clearance of $\frac{1}{4}$ inch at the bottom, so that if for any cause the valve should be prevented from opening at the proper time it will be only forced back from the seat, the opening of $\frac{1}{4}$ inch being sufficient to allow the engine to run at full speed with wrist plate and vacuum pot disconnected from outlet valves. This valve gear is extremely simple, and practical tests have shown it to work admirably. This engine is intended to run at a speed of 60 turns per minute if necessary.

In conclusion, the tendency in designing blowing engines seems to be in the following directions:

1. Compounding.

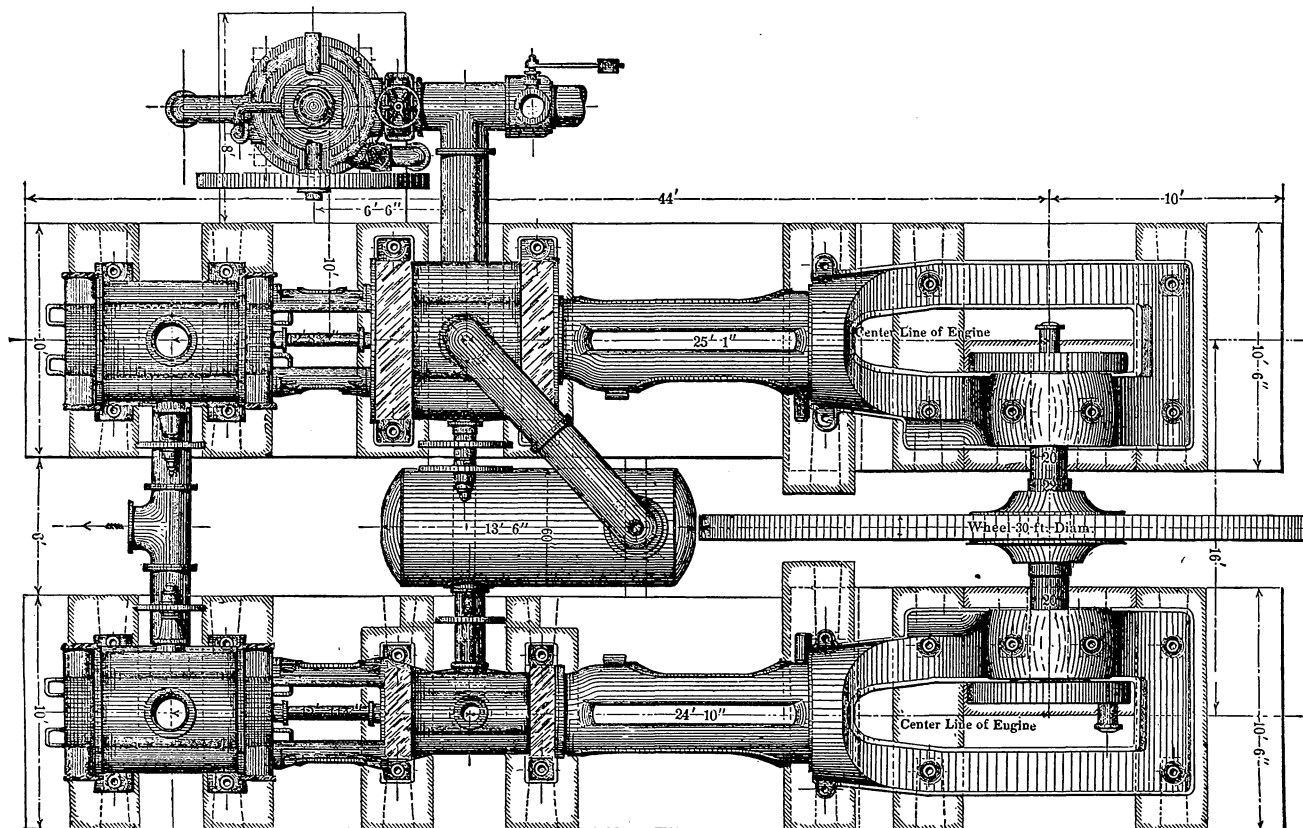


Fig. 2.—Plan.

BESSEMER BLOWING ENGINE, OHIO STEEL COMPANY.

heads, was heated about 25° C. more than in the case of the other engine. It is plain, therefore, that a blowing engine should have air valves which will not only give ample area of inlet passage, but give this in a small number of good-sized openings.

Figs. 1 and 2 are the plan and elevation, and Fig. 3 is the diagram of air valves and valve gear of a compound horizontal blowing engine, now being constructed by the well-known builders, the E. P. Allis Company, for the Ohio Steel Company. The engine is a Reynolds Corliss cross compound; steam cylinders, 40 x 78 inch; air cylinders, 60 inch; stroke, 60-inch, with reheater in intermediate receiver, and is provided with an independent condenser. In general design this engine, as will be seen at a glance, is very similar to the large quadruple-expansion engine by the same builders to be seen at the exposition. The air cylinders are so arranged as to draw the air through pipes, which project above the roof of the

holding it against the seat, and remains stationary during the return stroke of the piston, and also while the piston advances toward it again, until it has compressed the air in the cylinder to nearly the same pressure as in the receiver, at which time the pressure on the back of the valve becomes so nearly balanced that the vacuum pot can move the valve, which is then quickly thrown open. The telescopic connecting rod is so constructed that a small dash pot is formed at the bottom of the tube, to avoid shock should the plunger strike the bottom while the valve is open or when the closing motion begins. It will be observed that no trip or releasing gear of any kind is used with these valves, the holding and releasing being done by friction, controlled in the simplest possible manner by the air pressure in receiver and cylinder. The outlet valves are also held against their seats by long flat springs bearing in the center on the back of the valve and at ends on blocks

2. Obtaining valve gear which will give liberal openings at both inlet and outlet, and which can be operated at a fairly rapid speed.

The latter advantage can probably be best secured by the use of metal valves operated as far as possible positively, which will also do away with the vexation due to the use of leather, gum and other short-lived materials.

In the discussion to this paper, Fred. W. Gordon of Philadelphia contributed the following: There can be no objection to the use of cross compound blowing engines, and when they are condensing they are susceptible of great range of duty with slight loss in efficiency. By those who have use for the full heat of the waste gases, this type of engine should be used; but many furnaces are not so located. The pig iron is their finished product, and the gases are to be used only for furnace use. In this case simple engines are preferable, being less expensive and having less parts to take care of, which

reasons determined the introduction of the engines designed by me for the Poughkeepsie Iron Company. There are three of these engines to furnish blast for two furnaces, for a make of about 250 tons per day, using 75 per cent. anthracite and 85 per cent. magnetic ores, and they are expected to blow up to 20 pounds pressure per square inch.

For blast furnaces I prefer the single to the coupled engine, except in compounding. The engine presented (see *The Iron Age*, June 22, 1893, page 1380) is practically the same as half of that presented by Mr. Kennedy, except in detail. Our inlet valve is double ported and placed inside the cylinder, whereby it works under less constant pressure and has less motion, while the

is $7\frac{1}{4}$ inches diameter, which, with its own weight and the weight of the blast piston, has a deflection of $\frac{1}{8}$ inch. The slipper referred to and the full-width bull ring of the steam piston have to carry this. The stuffing boxes are made to accommodate the spring of the rod. The blast piston is turned $\frac{1}{4}$ smaller than the cylinder, and the brass segmental rings only touch the cylinder. We think, with these plans well carried out, there can be no further objection to the blowing horizontal engine than to the horizontal engine so extensively used, and it has the same advantages.

Through a reorganization of the Chapin Mining Company, at Milwaukee, Wis., on the 10th inst., Ferdinand Schlesin-

dividend may be earned, which, from the low rates ruling for the past four weeks, has been an impossibility. This action will materially reduce the amount of tonnage from which Baltimore, Philadelphia and Newport News shippers have been accustomed to draw.

Self-Balancing Turbine.

In the De Laval steam turbine, which runs at a speed of 30,000 revolutions for the 5 horse-power machine, a novel method is employed for obviating any defect in the balancing. The turbine is provided with a flexible shaft, the wheel disk being placed on the thin portion of the shaft and at a consider-

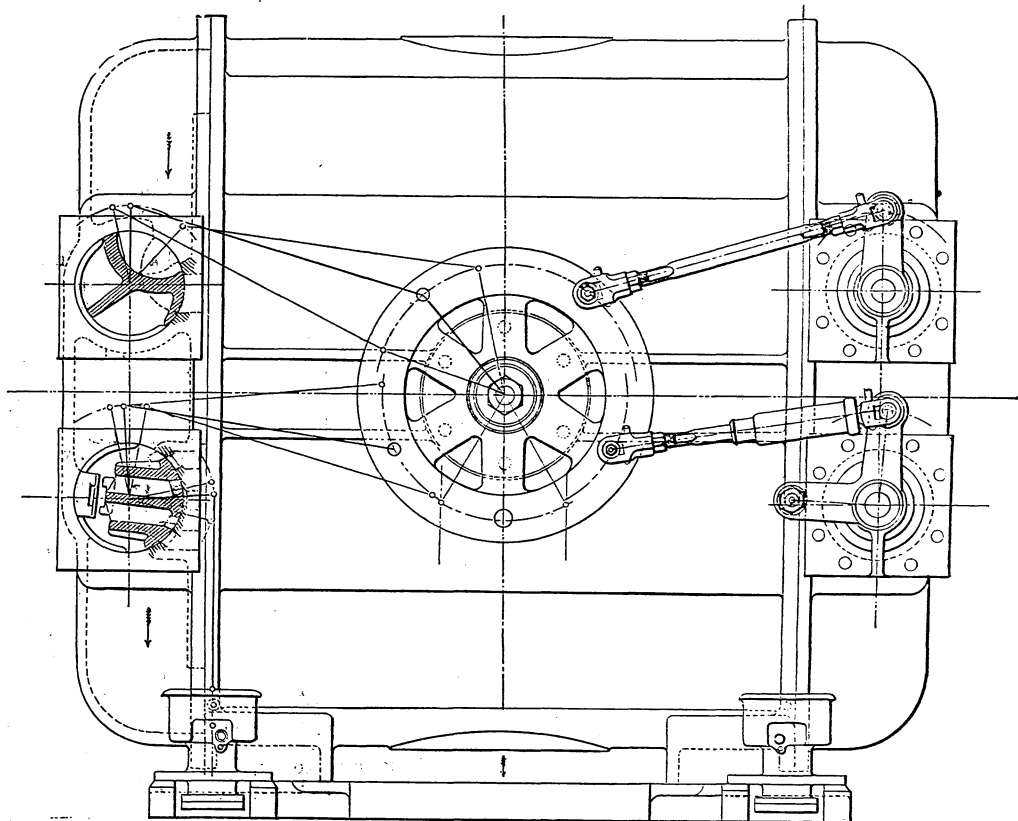


Fig. 3.—Elevation of Air Cylinder and Valve Gear.

BESSEMER BLOWING ENGINE, OHIO STEEL COMPANY.

increase of clearance is but one half of 1 per cent. These valves have each 452 square inches area, which for the limited piston speed of 360 feet is ample. The outlet valve openings in head are 6 inches in diameter and there are 36 in all—18 in each end. The valves are very light, of phosphor bronze, have flat seats and slide on fixed stems. The valve's center of gravity is in the line of the seat to avoid a tendency to cant. The end of the stem is a collar $2\frac{1}{4}$ inches in diameter, forming a piston fitted to a chamber in the valve. This acts as an air cushion and saves the valve seat and the noise of rapid closing. Loose leather collars, between which the air always exists, form the cushion for the opening movement. When compared to the usual area of air-compressor engines, these will appear excessive.

Horizontal blowing engines have long since been out of date, and simultaneously here are two large machines presented. You will note that our engine has a tail-end bearing. The piston rod

ger retires from the management of the company, and R. C. Flanagan of Norway, Mich., succeeds him as trustee for the creditors. Under the plan of reorganization the company are to issue \$1,033,000 of bonds in three classes. The first class is to be \$200,000, to be due in a year, the second \$538,000, payable in two years, and the third \$300,000, payable in four years. The first class is to be used in paying labor claims and in keeping the mine in repair. The second class is to pay freight and royalties. The third class is to be used in operating expenses. The debts of the company for royalties, labor, &c., amount to \$625,000 and the quick assets to \$600,000.

The New England vessel owners are reported to be contemplating the laying up of coal vessels aggregating from 200,000 to 250,000 tons of coal-carrying capacity, in order to regulate coastwise freight rates on coal, so that a

able distance from the bearings, the shaft for 20 horse-power being about $\frac{1}{4}$ inch in diameter for a distance of about 4 or 5 inches each side of the disk.

A yielding shaft allows the turbine at the high rate of speed to adjust itself and revolve around its true center of gravity, the center line of the shaft meanwhile describing a surface of revolution. If the shaft were stiff the vibrations of the turbine wheel would be communicated to the bearings, which would then run warm. The purpose of allowing an adjustment of the wheel can also be accomplished by making the journals yielding; but this arrangement requires complicated and expensive details of construction. The bearing of the free end of the flexible shaft is provided with a ball fastening, in order to allow it to adjust itself to the shaft. Moreover, all the journals are provided with lubricating grooves and anti-friction metal, thus being specially adapted for effective lubrication.

THE WEEK.

The largest consignment of gold that ever reached the United States in one vessel was landed from the North German Lloyd Company's steamer "Spree" at New York last week. It amounted to \$4,250,000, packed in 126 boxes, the whole weighing some six and a half tons.

The Mississippi Valley Lumber Association meeting last week in Minneapolis in semi annual session agreed to reduce the cut for the rest of the season one-half. The sawmills will be closed on September 20.

Comptroller Eckels predicts that nine out of ten of the banks which have closed during the present stress will open for business again.

Rice cultivation is strongly recommended by the Agricultural Department in certain sections of the South, particularly in Southwest Louisiana, where there are hundreds of thousands of acres lying idle which are admirably adapted for raising this cereal. As rice forms the staple food of more than two-thirds of the human race a market for all that can be grown will never be wanting.

This year's British wheat crop is estimated at 7,000,000 quarters, which leaves about 21,000,000 quarters to be imported. Reducing the stock left over from 1892, there will be needed 19,000,000 quarters. The *Mark Lane Express* of London, in its weekly review of the British grain trade, said a few days ago in respect of this circumstance: "It is not easy to see where this supply is to come from. It will absorb all the good crops of Russia, India and South-eastern Europe to fill the British requirements." Where do the United States and Canada come in? Wheat is said to be grown in both countries.

Business in the iron and steel trades was dead in Sweden during 1892, but hopes of new markets are indulged in from her exhibits at Chicago.

The following table gives the total value of exports of leading domestic products from the United States for two years to June 30:

	1892.	1893.
Cotton, raw.....	\$258,461,241	\$188,766,274
Breadstuffs.....	249,363,117	199,034,203
Meat and dairy products.....	140,362,159	137,031,669
Cattle, sheep and hogs.....	35,624,281	28,541,601
Mineral oils.....	44,805,992	42,077,770
All other articles....	237,152,221	237,339,013
Total.....	\$1,015,732,011	\$830,790,730

Cargoes of all descriptions are unusually scarce on the lakes and there is general mention of vessels laying up till better times.

The executive and advisory councils at Honolulu have introduced an act vesting the crown lands of Hawaii in the provisional government and providing for their division and settlement.

Kansas will have a wheat crop of less than one-third of last year's product.

Impending war in the wall paper trade is rumored on account of the alleged efforts of the National Wall Paper Company to boycott the manufacturers who do not work with that combination. The company are said to control 80 per cent. of the entire output of the United States, and it is claimed that they have secured almost the whole trade of the country by offering premiums to such jobbers and retailers as pur-

chase their supplies exclusively. The 20 per cent. of outsiders are now combining to fight the consolidated corporation.

The Treasury Department has issued a detailed statement of receipts from internal revenue for the fiscal year ending June 30, 1893, which shows an increase in nearly every department, even greater in proportion than the growth of the country in population. The net increase of receipts from all sources was \$7,145,093, or from \$153,857,544 in 1892 to \$161,002,637 for the past fiscal year.

Canadian Pacific Railway reports indicate that the crops in the Northwest of Canada will far exceed the yield of last year.

The August Government crop report for the United States shows a decline in the condition of nearly all agricultural productions except hay, due mainly to the drought which has prevailed in most parts of the country.

Western farmers are anxious to ship their hay for export to Europe, but as they want fancy prices for it, shippers will not take hold. No domestic hay has consequently been exported yet, although Canada is sending her's abroad in great quantities through the New York bonded warehouses.

One of the largest steamboats in the world was launched on Thursday, August 10, at the shipyard of the Delaware River Iron Ship Building & Engine Company, formerly the John Roach shipyard, at Chester, Pa. The vessel has been built for the Fall River Line and is named the "Priscilla." The boat, which is larger than the well-known "Puritan," is 424 feet on the water-line and 440 feet over all. Her width is 52 feet 6 inches, draft 12 feet 6 inches, and total displacement about 4550 tons, with cargo capacity of 800 tons and passenger capacity of 1400. The hull of the vessel is built of steel, with 52 water-tight compartments, and she will be furnished with double inclined compound engines, with 8500 indicated horse power. The design of the "Priscilla" is due to George Pierce, supervisor of the Fall River Line, and the engines were designed by Andrew Fletcher of the North River Iron Works, Hoboken. The vessel will receive her engines and be finished in New York.

Reports of retrenchment on leading railroads continue to be published.

A decision favorable to the Chicago Power Supply & Smoke Abating Company has been given by the Chicago courts, permitting them to proceed with the work of laying a conduit through the business part of the city for the supply of compressed air at 100 pounds per square inch. The air will be sold at a fixed rate for power purposes and for ventilating theaters, schools, hospitals, &c.

Implement manufacturers and dealers in Minneapolis and St. Paul have had a desperately dull season, except in the line of harvesting machinery. In South Dakota, on the contrary, a very large trade has been done in all lines of agricultural machinery, owing to the great influx of immigrants to that State during the present season.

Negotiations are going on between the governments of Great Britain and the United States for the establishment of an international system of removing the floating wrecks which are a menace to transatlantic navigation. It is pro-

posed that the two governments should each detach two vessels for the purpose of clearing the ocean track of such derelicts.

The question of accepting part payments of their wages and allowing the remainder to stand to their credit on the books of their employers until the financial stringency is ended will probably be decided among the members of the American Flint Glass Workers' Union affirmatively, and it is probable that by the influence which they will be able to exert the national officers of the union will facilitate the early starting of a number of factories and the employment of thousands of men.

The Austrian Board of Trade report for the year 1892 shows the exports from that country to have been \$275,691,600, and the imports \$238,963,200; leaving a balance in favor of the monarchy of \$36,728,400, which is little more than half that of the preceding year. The year 1892 was, however, generally one of reduced production and sale.

In view of the tariff war between Germany and Russia, which appears likely to close the markets of the former to Caucasian grain, it is interesting to find that the United States is the principal grain supplier of the Fatherland, Russia coming first in barley only. The German grain imports from the two countries during 1892 were as follows:

	Wheat. Tons.	Rye. Tons.	Barley. Tons.
From United States.....	620,213	136,129	10,293
From Russia.....	257,899	123,887	17,075

The other contributing countries were Roumania, Argentina, Bulgaria, British East India, Austria and the Netherlands, but in much smaller quantities.

James H. Eckels, Comptroller of the Currency, in a letter to F. B. Baird, vice-president of the Buffalo Furnace Company, stated that, in his opinion, it would not be unlawful to use certified checks as currency, because such a course would involve a contract between the depositor and his creditor, and would be independent of the bank. "As understood, the proposition appears to involve a business contract between the depositors and their creditors, and in my opinion such transaction would not constitute a violation of Section 5183, as the checks will be issued by the depositors and not by the banks. As to a certification of such checks by national banks when drawn against deposits to credit of drawer, I can find no legal objection."

Charles D. Kellogg of the Charity Organization Society says that pauperism has for the past ten years increased in a far larger proportion than the population of New York, owing to the vast immigration of indigent aliens.

Between 1859 and 1889 India absorbed \$561,600,000 in gold and \$1,089,600,000 in silver, or \$1,651,200,000 in all. What has become of the silver we do not exactly know, says the *London Spectator*, though it is certain that a great proportion of it is hoarded as fixed and visible wealth, but about the destination of the gold there is no doubt whatever. The people have got the whole of it in their own hands, for it is not in circulation, and are using it either in ornaments, kept, be it observed, to pawn in extremity, or as hoarded treasure in coin, such as lies under almost ever peasant's floor in the Punjab and Eastern Bengal.

The Iron Age

New York, Thursday, August 17, 1893.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Silver and the Debtor Class.

There has been an inclination during the heated discussion of the silver question to regard the producers of the white metal as its foremost representatives. It may have been inexplicable to many that an interest so insignificant, relatively speaking, as that of silver mining should command so great an influence. As a matter of fact, the silver miners represent only the skirmish line of the great army for whom the battle is being waged by those who believe that an injustice is being done. While we recognize that there are many champions of silver who are demagogues pure and simple, we are willing to admit that many earnest men are fighting for what they conscientiously hold to be the side of justice. Senator Vest, in the course of the debate in Congress, has summarized the position of these advocates of silver in the following words:

"There is no justice to the debtor, who has made his contract under the bimetallic system, to take away one-half of the currency of the country, and thus take away more than half of his property. No living man can justify such legislation. If Congress had the power now to put this country (all obligations being out of the way) on a single standard, the issue might be a fair one; but, with debts to the amount of \$8,000,000,000 due by the United States, the striking down of about one-half of the currency of the country would be not only unjust and ruinous, but absolutely wicked."

In other words, the debtor class shall have the privilege of paying what it owes in either gold or silver. If silver has declined in value when the loan becomes due, so much the better for the debtor, who is entitled to the advantages of such a decline. When he made his contract, both the creditor and the debtor knew that he might tender one or the other metal. The creditor had the right to insert a gold clause, a right which he did not avail himself of. He is, therefore, not entitled to complain when events have gone against him.

That is all very well, were it not for the fact that the United States Government pledged itself to maintain the parity of gold and silver existing at the time when the contract was entered into. In that capacity it became a party to the agreement.

Now the partisans of silver themselves confess that the old ratio cannot be maintained, since they advocate

the adoption of 20 to 1, or even of 24 to 1, as the new standard of value. They acknowledge, therefore, the third party to the agreement is not to live up to its engagement.

If this country had no business dealings whatever with foreign nations, little trouble might ensue. But since we do trade with them, and do owe them money, foreigners insist upon payment in gold. Fearing a further depreciation they call in their loans and restrict their credits, their example being followed by moneyed men in this country, who would rather pocket a moderate loss now than take the chances for the future. With one party to the bargain intent upon making special terms, and his guarantor weakening under the load, the second party, the creditor, naturally becomes alarmed and distrustful. Until moneyed men are thoroughly assured that no pranks will be played with them by those who believe that they voice the sentiments of the debtor class, capital will hold aloof and money will continue to be hoarded.

We are convinced, however, that few of those who owe money are eager to take advantage of a possible chance to pay back in a depreciated coin. If it were possible to arouse the better element among the debtor class to a vigorous expression of dissent from their self-constituted guardians a good deal would be gained. Indirectly the men who work with borrowed money and have most to gain by maintaining their credit are the greatest losers of property when capital is withdrawn. The greatest sufferers are those who labor with their hands, because they must either deny themselves the necessities of life or must attack their hard-earned accumulations.

We are far from holding that the silver question alone is responsible for the present condition of affairs. We know that the fear of tariff legislation has an important effect and that past national, municipal and personal extravagance has been an influential factor. But before any other co-ordinate causes are dealt with, the fact must be accepted by an overwhelming majority of our people that a debtor cannot afford to indulge in even partial repudiation without disastrous consequences to himself personally and to the community at large.

Were it not for the fact that piece and tonnage men in our industrial establishments are earning only very small sums because they are idle a considerable part of the time, the announcements of reductions in wages would be far more numerous than they are. And yet this system of payment is vindicating itself, even from the standpoint of the employee. With labor employed on the time basis it is now only too often a choice between total idleness or a sharp reduction in the rate of wages. In some instances, where the latter alternative would bring about a struggle with

strong associations, manufacturers either close down altogether or discharge the unmarried or inefficient men. In times like these strong unions are an element of disadvantage to their individual members, since employers prefer idleness to unprofitable work, hampered by endless bickerings with their men.

Industrial Growth Checked.

The manner in which the dearth of money has checked all industrial progress and the rehabilitation of insolvent enterprises is being very forcibly illustrated just now in a few notable instances in Wall street. The long period of depression and attendant bankruptcy which followed the May panic left a number of properties on the shoals. Of the dozen or more mention might be made of National Cordage, Reading, Erie and Northern Pacific. Efforts have been made in a number of cases toward reorganization with only partial success.

The Reading plan was the most favorable one to shareholders, but it fell through because of the opposition of certain general mortgage bondholders. It is generally conceded as fortunate that it did, for had the underwriting syndicate been called upon to hold up the company during the period of tight money through which the country is passing, the strain would have been seriously felt in other directions. The failure of the plan to go through further weakened public confidence, and, without doubt, contributed to the period of distrust which followed.

The Richmond Terminal plan, a most drastic one in its nature, was assented to by nearly all of the multitude of security holders who came under its jurisdiction, simply because it was the only action of a saving nature which they could take. The assessments were regarded as a hardship at the time it was launched, which was during a period when money was much easier than at present. Since the scarcity became aggravated many holders have been forced to sell out; as a result one of the stocks included in the plan, and a fair criterion of the others, sold at $\frac{3}{8}$ of \$1 per share, after two cash assessments aggregating \$3 $\frac{1}{8}$ had been paid thereon. This demonstrates that it is next to impossible to pay the assessments.

Cordage is another concern whose rehabilitation is being delayed on account of tight money. The plan provides for an assessment of 10 per cent. on the common stock and 20 per cent. on the preferred. The first assessment on each, amounting to \$5 and \$10 per share, respectively, was paid on July 10. The second assessment of \$5 per share on each class, due August 10, was extended until August 26, with the understanding that it should bear interest at the rate of 6 per cent. Before the first assessment was paid the common stock was selling at about \$10 per share; with the assessment

paid the current price is about the same figure, it having lost 5 per cent. since July 10. This affords little encouragement to shareholders, who will soon be forced to pay the second assessment. No one questions the ability of the bankers' syndicate which has the reorganization in charge to bring it to a successful conclusion. The time required, however, will, unless conditions change materially, be longer than September 10, the date on which the last assessment on the preferred stock is due.

General Electric has a floating debt of about \$4,000,000. It has been making heroic efforts to fund this, and without tangible results until lately. The stock, in consequence, sold down from 115 to 31, and is now about 40. We understand that a plan will be put out in a few days to care for this floating debt. From the little known of the plan the opinion formed is that drastic measures have been resorted to to raise the money. A security company will be formed with a preferred capital of from \$4,000,000 to \$4,500,000, entitled to 6 per cent. interest, and a common capital stock of from \$4,000,000 to \$4,500,000 to be given as a bonus to the subscribers of the preferred. This issue of from \$8,000,000 to \$9,000,000 stock is to be made to raise \$4,000,000 cash. The assets against which the stock is to be issued are the security assets in the company's treasury, which, on January 1, represented a par value of \$16,220,391, and an 8 per cent. value of \$9,173,251. Of these stocks some 15,000 shares of New York Edison Electric Illuminating and 5000 of Boston Edison Electric Illuminating were sold early in the spring to relieve the more pressing needs of the company. The amount of these stocks which will be used to offset the stock to be issued is not known.

Another example of the damper which is being placed on industrial enterprises is the action taken by the Manhattan directors Tuesday regarding rapid transit in New York. This company went so far, late in the spring, in their negotiations as to offer the city \$100,000 per annum in addition to their regular tax for franchises, reserving the right to build to Yonkers at their discretion. The city's proposition was not greatly different, and the belief prevailed that an agreement would be reached. The communication which will be read before the Rapid Transit Commission to-day will say that in view of the financial depression the Manhattan Elevated Railway Company deem it unwise to undertake extensions such as are proposed, thus giving up the project unless the Rapid Transit Commission deem it wise to wait until times change for the better.

Other examples might be cited, but the foregoing is sufficient to show that it is next to impossible, even where the strongest backing exists, to place enterprises on their feet, much less extend those which are in existence. In the same degree it is impossible to float new concerns, and it can be said that not one of any prominence has appeared in Wall street for four months.

The National Lead Company.

In the spring *The Iron Age* referred editorially to the unwarranted attack made upon the National Lead Company's stock by the bear contingent of Wall street. We pointed out the fact that rumors of ruinous competition, the payment of dividends not earned, the deterioration of the company's product and a score of others of the same sort, notably that the common stock would not pay a second dividend, were false. This attitude has been fully confirmed by subsequent events. Notwithstanding the fact that the National Lead Company are engaged in manufacture in a dozen different lines, that their business extends over every State in the Union, and that they are largely dependent upon the prosperity of the country for their revenue, they have been placed in a position to weather the storm at the minimum loss. A case in point: President Thompson became convinced early in the summer that there would be an upheaval in the silver industry, and thereupon closed down, two months before the action of the India Council became known, the company's two smelting plants. When the savage drop in the price of silver came the company were without any bullion on hand, having disposed of it at the higher figures. To-day the company have nearly \$1,000,000 in the bank, report that collections are excellent, that prices are fully maintained and that the volume of business is nearly up to the average.

Six Months' Bank Failures.—*Bradstreet's* has made a compilation covering the first six months of the current year concerning bank failures. The record given shows that 43 national banks suspended payments permanently or temporarily during the first half of this year, owing, as nearly as has been ascertained, about \$23,106,000, and reporting \$23,429,000 in assets. The number of State banks similarly situated was 72, with \$15,865,000 liabilities and \$14,599,000 assets; savings banks 20, with \$6,170,000 liabilities and \$6,462,000 assets; loan and trust companies 4, with \$12,765,000 debts and \$5,850,000 assets, and 80 private banks and bankers, with liabilities amounting to \$9,383,000 and assets to \$8,038,000. There were also 5 mortgage loan and investment companies reported embarrassed, with \$1,090,000 of debts and \$420,000 assets, while 8 brokers in securities were forced to suspend, owing \$1,603,000 and having assets of \$692,000. The 43 embarrassed national banks, owing \$23,106,000 and having assets of \$23,429,000, may be contrasted with 176 State, savings and private banks and trust company banking institutions suspended, owing in the aggregate \$40,741,000 and having \$30,958,000 to pay with. Aggregates of debts of embarrassed State and private banks and trust companies showed excesses as compared with assets reported.

A new naphtha launch, the "Queen Anne," excites some interest in engineering circles in Chicago. The explosion in the naphtha vapor which furnishes the power is caused by introducing an electric spark. The "Queen Anne" and her engine were designed and built by Thomas Kane of Racine, Wis., and brought to Chicago for trial. The naphtha is changed into vapor in the front part of the boat, and is conducted to the cylinders of the engine. The electricity is furnished by a six cell battery under the floor, and the wires

lead to the two cylinders. The chief merit of this engine over steam for a small boat is that it does away with heat, the boiler and fire box of the ordinary launch being done away with. The engine is easy to handle, and the boat does not require a licensed engineer and pilot. The machinery develops about 10 net horse power, and will run the launch about 10 miles an hour. The propeller wheel is 32 inches in diameter. The boat itself is 33 feet long and 8 feet beam, and draws 32 inches. During the run from Racine to Chicago the engine behaved well, and Mr. Kane is confident that it will revolutionize the motive power of small boats.

CORRESPONDENCE.

American Cream Separator Bowls.

To the Editor: In your issue of August 3, page 192, in speaking of the Surahammer Works exhibit at the fair, your correspondent uses this expression in speaking of the steel milk separator bowls for dairy use: "These works enjoy a monopoly of this trade, as they are the only works in the world where these machines are made."

We wish to call your attention to the inclosed catalogue illustrating this same style of work as is done by this company. Take, for example, the cut of the bowl on the cover of our small catalogue, which is the very style of bowl that they mention. We call your attention to page 19, showing a bowl that is much more difficult to make, which is made of $\frac{7}{8}$ -inch Otis steel; and if your correspondent will go into the Transportation Building he will see there exhibited by the Otis Steel Company several different designs of cream separator bowls made by us from their steel, which, we are informed by experts, are equal in workmanship and finish to either the exhibit of the Surahammer Works or the Krupp. We are a little jealous of our reputation on this class of work, and if your correspondent will also see the exhibit of Davis & Rankin Building & Mfg. Company, in the Dairy Exhibit, he will see bowls in the rough forging, and also in the finished state in operation. We would also call his attention to work done by us from Singer & Nimick steel, Pittsburgh, in their exhibit, which, we think, is in the Manufactures and Liberal Arts Building.

We would add that we have letters from manufacturers of dairy machinery in this country who claim that our work is equal to any of the bowls that they have imported, and also that the quality of steel made by the Otis Steel Company expressly for these bowls is equal in quality to any Swedish steel that they ever worked on in this line of goods. As far as we know, we are the only works in the United States that have made, are making, or are able to make this class of work. Respectfully,

THE AVERY STAMPING COMPANY.

DOUGLAS PERKINS, receiver.
CLEVELAND, OHIO, August 5, 1893.

The United States protected cruiser "Minneapolis" was successfully launched at Cramps' shipyard, Philadelphia, on the afternoon of Saturday, August 12, in the presence of the Vice-President of the United States, Secretaries Herbert and Morton, and a large number of Senators and Representatives from Washington. The christening ceremony was performed by a daughter of Senator Washburn of Minneapolis.

MANUFACTURING.

Iron and Steel.

The Brown, Bonnell Iron Company, Youngstown, Ohio, advise us that there are no new developments in the matter of their firm building a new blast furnace to replace old Falcon Furnace, which has been dismantled. They also state that there is nothing new regarding wage scale negotiations, their entire plant being closed, with no immediate prospects of resumption. At the works of this concern general repairs are being made, and nearly all the mills are being overhauled and put in good shape. The net work of narrow-gauge tracks is being changed so as to make it more convenient to transfer iron from one place to another, and a new track is being laid to the new warehouse, the frame work of which has been completed. Two large scales for weighing iron have also been put in the new building.

The Lock Foundry Company of Decatur, Ill., will occupy their new quarters in September. As yet they have made no changes in their force or running time, and they are prepared to fill all orders in light gray iron castings, special patterns agricultural work, &c.

The Aetna-Standard Iron & Steel Company, large manufacturers of iron and steel sheets and bars, at Bridgeport, Ohio, have been compelled to make a general reduction in wages, which affects officials of the concern as well as employees. For the purpose of meeting any urgent demands on the part of their customers, and also to assort up their stocks, the Aetna-Standard Iron & Steel Company have started up three of their light sheet mills, and will therefore through their period of idleness be able to meet any ordinary call for supplies of stock material. The firm have not fixed any date for a general resumption of work.

The steel plant of the Colorado Fuel & Iron Company, at Pueblo, Col., resumed operations on Monday with a full force of 1600 men after a shut down for three weeks for repairs. The company have large orders ahead and will run for a year, it is said, without a cessation of operations. The rumor that there is dissatisfaction with the general superintendent, T. W. Robinson, formerly of the Illinois Steel Company, is unfounded.

Last week a notice was posted in open-hearth mill No. 2 of the Homestead Steel Works, at Homestead, Pa., stating that the employees would be laid off for two weeks to give the workmen in No. 1 mill an opportunity to work, so that all employees would have an equal chance to work during the dull business. Open hearth mill No. 1, with the exception of one furnace, has been idle for two weeks.

At the Warren mill of the Youngstown Iron & Steel Company, at Warren, Ohio, all the office force, mechanics and millwrights have been notified that their services will not be needed for the present.

Sharpsville Furnace of the Sharpsville Furnace Company, at Sharpsville, Pa., has been banked down temporarily until the condition of the iron market improves.

The Black Diamond Steel Works of Park, Brother & Co., at Pittsburgh, Pa., closed down on Saturday, the 12th inst., on account of lack of orders. The shut down will probably last only a week, or it may last longer, if sufficient orders to resume operations have not been received in the meantime. On the above date this firm paid off their men, giving them cash for two-thirds of the amount due them and checks for the balance.

The works of the Sterling Steel Company, located at Demmler, Pa., near Pittsburgh, are in operation to nearly their full capacity, giving employment to about 150 men. This concern has a large amount of Government work on hand, which will keep them partially employed for some time.

In all probability an arrangement will be consummated at an early date by which the large plant of the National Tube Works Company at McKeesport, Pa., now idle in all departments, will be put in partial operation. W. C. Converse, general manager of the concern, was in McKeesport last week, and it is believed that, as a result of his visit, the workmen will agree to accept a temporary reduction in wages, with the understanding that with improved trade conditions the reduction will be restored. It is stated that a full appreciation of the condition of affairs exists among the

workmen, and that they are ready and willing to agree to any arrangement by which operations can be resumed.

Every effort is being made to cut down expenses as much as possible at the Homestead Steel Works, Homestead, Pa. A large number of clerks have recently been indefinitely suspended, and the same action will soon be taken with others. None of the departments of this large plant are being operated full time, and in the 119-inch plate mill operations are being conducted on single turn instead of triple turn, the usual custom at this plant.

Last week notices were posted in the American Iron & Steel Works of Jones & Laughlins, Limited, of Pittsburgh, to the effect that the Bessemer steel department will be closed, and also that operations would be suspended in the sheet mill, and in finishing mills Nos. 2 and 10. About 650 men are thrown idle by this suspension of operations.

On Tuesday, the 8th inst., two lap-weld furnaces and two butt-weld furnaces in the plant of the American Tube & Iron Company, at Middletown, Pa., were put in operation. Future operations of the plant depend largely on the number of orders received and the general condition of trade. The present resumption is more of a cleaning up process, in order to get the stock on hand into a merchantable shape, than anything else. It is probable that the works of this concern at Youngstown, Ohio, will also be put in partial operation during this week. Wages of employees at both plants have been reduced 10 per cent.

The Paige Tube Company, Warren, Ohio, will remain idle until the rolling mills resume operations, of which due notice will be given through the newspapers.

It is claimed that the only tube works now in full operation in the United States is that of the Syracuse Tube Company of Syracuse, N. Y.

The Cambridge Corrugating Company, Cambridge, Ohio, after being in business a little over one year, have vacated their leased building and moved into their own new factory, built especially for manufacturing a complete line of corrugated roofing and siding, and a variety of iron and steel products for building purposes. The new building is adjacent to railroad tracks and has excellent shipping facilities. New machinery and modern conveniences are employed. The officers of the company are T. E. Amos, president; C. S. McMahon, secretary; P. C. Patterson, general manager; W. L. Stanley, superintendent.

Press reports state that the sheet steel works and tin-plate department of Wallace, Banfield & Co., Irondale, Ohio (near Wellsburg), have closed down for an indefinite period. Later reports state that the temporary closing of the works is only a precautionary measure. Nothing definite is stated concerning the future action of the company. Trade developments are awaited before operations will be pushed with the vigor of the past. In the meantime operations may be partially continued.

The breakage of a main shaft has laid off two sheet mills of the Sharon Iron Company, Sharon, Pa., for two or three weeks.

The Nova Scotia Steel & Forge Company, New Glasgow, Nova Scotia, are making extensive additions to their works. A boiler-plate mill is contemplated, and it is probable that a sheet mill will follow. The Dominion of Canada consumes large quantities of iron and steel sheets each year, but none are manufactured in that country. Statistics show that nearly all that is used is imported from Great Britain.

The operators of the Gadsden, Ala., Furnace state that the report that the furnace would close down on account of the failure of the Attalla Mining & Mfg. Company is entirely incorrect. The furnace is in blast, and there is no prospect of an immediate cessation of work.

It is stated that the Licking Rolling Mills, at Covington, Ky., which closed down a few weeks since, throwing 350 men out of employment, will be placed in operation again at once.

It is stated that the furnace at Dayton, Tenn., will blow out this week and remain idle until there is an improvement in the iron trade.

Reports from Cincinnati, Ohio, indicate that a movement is well under way for a resumption of operations in the rolling mills of that district. During the summer shut down the Newport Iron & Steel Company have put a new foundation under their large engine. It is expected that

work in their mills will be commenced very soon. This concern makes a specialty of light sheets for roofing and corrugating purposes. The jobbing mill of the Licking Rolling Mill has been changed to a light sheet mill and other improvements have been made. This mill resumed work on Wednesday, the 9th ult., and the outlook is good for steady work. The Cincinnati Rolling Mill Company, who are now proprietors of the Riverside Mill, have also changed their jobbing mill for the purpose of making light sheets exclusively, the product being used largely for galvanizing purposes. This plant is now in full operation. At Mitchell, Tranter & Co.'s mills no changes were made this summer. Operations have commenced and a steady run is anticipated. The Anchor Iron Works, formerly owned by the late Colonel Dayton, which were sold recently for the extraordinarily low sum of \$38,000, are still idle and nothing can be learned concerning the future of this plant. Machine shops, boiler works and other industries allied to the iron and steel trade are doing a fair business.

The Citico Furnace, at Chattanooga, Tenn., has banked its fires while some necessary repairs are being made. It will probably resume in the course of a week or ten days.

The Etowah Mining & Mfg. Company of Gadsden, Ala., owing to the tightness in money matters and desirous of protecting all creditors, have filed a deed of trust with W. M. Nixon as trustee, according to the Birmingham News. The assets of the company are about five times greater than their liabilities. On June 12 last the company purchased the Attalla Mining & Mfg. Company, which property is included in the deed of trust.

The Edgemoor Iron Company of Edgemoor, Del., are experiencing the depression which is general throughout the iron trade of the country, and have found it necessary to lay off a number of hands in the various departments.

The Cherry Valley Furnace, at Leetonia, Ohio, has blown out for the purpose of relining. It is expected that the furnace will blow in again as soon as repairs have been completed.

The Low Moor Iron Company of Virginia, whose furnace is situated at Low Moor, Allegheny County, Va., have not felt the effects of the depression of which their competitors in the iron trade generally complain. With the exception of slow collections and a slight falling off in orders their business is up to its usual mark. The furnace is now running, and will continue in operation, so far as is now known.

The Phoenix Iron Company, Phoenixville, Pa., have notified their day workmen of a reduction in wages, and the rollers and heaters of an increase in their tonnage. The reduction is stated to be equivalent to 15 per cent. The dullness in the iron trade has made a curtailment of expenses necessary, and the company considered a reduction in wages preferable to a reduction in force.

The American Steel Works, located at Garwood, N. J., have closed down indefinitely, throwing out 150 men.

The Scottdale Iron & Steel Company of Scottdale, Pa., have started their rolling mill, after a shut down of several weeks for repairs.

The puddlers employed on the day turn at the Cherry Valley Iron Works, at Leetonia, Ohio, who were out on strike because the company refused to reinstate the puddlers of the night turn who had been discharged, have returned to work, the matter having been amicably adjusted.

On Saturday, the 12th inst., the Duquesne Steel Works, at Duquesne, Pa., closed down in all departments for an indefinite period, on account of lack of orders. Steel billets have been the exclusive product of these works for some time, the daily output being about 1000 tons. At the Homestead Steel Works, Homestead, Pa., the armor-plate mill, which has been running double turn for about a year, has been put on single turn. The reason advanced for the taking of this step is that the Government is not prepared to take armor plate as fast as it has been turned out, and as a result a large stock has accumulated. At the Beaver Falls Mills, Beaver Falls, Pa., which have been closed for three or four weeks, the wire-mills department was put in operation on Monday, the 14th inst., and the wire-nail department on the day following. The rod mills will not resume operations for some little time yet, owing to there being a large stock of rods on hand.

A meeting of the creditors of Wm. M. Kaufman & Co., proprietors of the Sheridan Furnaces, at Sheridan, Pa., was held in Reading, Pa., last week. The following statement of the affairs of Wm. M. Kaufman & Co. was presented to the creditors at the meeting: Bills payable, \$231,322.83; book accounts, \$38,960.64; J. J. Mohr, execution creditor, balance due, \$41,875.42; bonded and mortgage indebtedness payable, \$85,000; balance due hands, \$9000; total, \$406,158.89; assets, book accounts, good, \$5638.13; material on hand, \$68,854; book accounts receivable, doubtful, \$1940.24; personal property, \$1697.25; total, \$78,129.62, leaving a balance of bonded and floating indebtedness, \$328,029.27; real estate, \$396,840.41; liabilities on same, \$328,039.27; surplus, \$38,311.14. A statement was also read showing that \$10,338.07 worth of iron was shipped to Philadelphia and which is still on hand there, leaving Mr. Mohr's claim \$31,037.38. The firm stated that if allowed to continue in operation they were certain they would be able to pay their creditors in full in four years' time, payments of 25 per cent. of the indebtedness to be made annually. This proposition was accepted by the creditors, and in all probability the furnaces will continue in operation right along. It was also decided that a committee of three creditors be appointed to overlook the business and make suggestions to the firm in the interest of the creditors.

Machinery.

Isaac W. Frank of Pittsburgh has been appointed receiver for the Lewis Foundry & Machine Company of that city. The case is not one of financial embarrassment, but was brought about by difficulties between the stockholders and officials of the company. Mr. Frank, who has been appointed receiver, was connected with the Lewis Foundry & Machine Company for a number of years, but is now chairman and general manager of the Frank-Kneel and Machine Company of Pittsburgh, manufacturers of rolling mill machinery.

It is stated that the Westinghouse Electric & Mfg. Company of Pittsburgh are selling their products for cash only, but notwithstanding this the concern are now giving employment to about 1100 hands.

Gustave Ehrhardt & Sons of Pittsburgh, with works at Homewood, Pa., manufacturers of cold saws and cold-sawing machinery, have made an assignment to John Mulart.

The Reeves Pulley Company of Columbus, Ind., have just completed a wooden pulley 11½ feet in diameter, with a 72 inch face, for the Linden Paper Company of Holyoke, Mass., to be used in one of their mills. This is the largest face the company have ever constructed. This makes the fourth extremely large Reeves pulley shipped into Holyoke.

For the first time in 20 years every department of the immense plant of Russell & Co., at Massillon, Ohio, the well-known manufacturers of engines, threshers and saw mills, was closed down last week for an indefinite period. Heretofore at this season of the year this firm have been compelled ordinarily to run night and day, and even then were utterly unable to fill orders. In their automatic engine department, which includes their boiler department, orders have fallen off every month since October last, and recently contracts entered have been suspended, pending restoration of confidence. Forced purchases alone offer new business, and such is sought for so eagerly that cost seems to cut no figure in making prices. In their farm-machinery department orders have been materially affected by the low price of products. It is probable that work will be resumed in a small way in some departments as soon as their annual inventory has been taken, but to what extent this will be carried on is now quite uncertain.

Ten hours' work for nine hours' pay will hereafter be the rule at the machine shops and foundries of the Lloyd-Booth Company and Wm. Tod & Co., manufacturers of rolling-mill machinery and engines at Youngstown, Ohio. It is stated that other concerns will follow suit.

Griffith & Wedge, Zanesville, Ohio, continue to employ their full force of men in the manufacture of mining machinery, which they are shipping as fast as made to various mining regions.

The Akron Tool Company of Akron, Ohio, are in receipt of orders from the Pittsburgh, Shenango & Lake Erie Railway Company and the Alabama Midland

Railway Company for McNeil balanced, automatic dump, charging barrows, to equip the coaling stations of the lines referred to. They have an order from the Cleveland Gaslight & Coke Company for an additional number of these barrows of extra heavy weight for use in handling hot coke.

The Blandy Machine Company, Zanesville, Ohio, are able to keep their force together during dull times. They are engaged in the manufacture of engines and boilers, also brick-making machinery, for which the demand holds good.

The Fulton Boiler Works of Richmond, Ind., are running full handed in every branch of their business. Their boiler shop is very rushed, and as they sell chiefly to consumers direct, their sheet-iron works and foundry are proportionately busy.

The Southern Malleable Iron Works, Chattanooga, Tenn., are reported to have resumed operations and to be crowded with orders, including a large contract with the Missouri Car & Foundry Company for the necessary iron work for 1000 cars. An additional wing is to be built to the present shop.

Frank B. Dyche has been appointed receiver for the Rice & Whitacre Mfg. Company, manufacturers of engines, boilers and steam and hot-water appliances at 47 South Canal street, Chicago. The application was made by Emma L. S. Rice, one of several in whose favor the company confessed judgments on the 8th inst., for amounts aggregating \$14,275. The company were organized with a capital stock of \$60,000 and claim present assets approximating this amount. No estimate is made of the liabilities beyond the general admissions of the concern's inability to meet their obligations.

Creditors of the Hercules Iron Company of Chicago held a meeting last week to consider a proposition to continue operating the Aurora plant in the interests of creditors. The cold-storage warehouse fire at the World's Fair was a total loss to the company, and when the assignment was made the liabilities of the company were found to be \$400,000, with doubtful and slow assets approximating that amount. The consensus of opinion was that the plant at Aurora should be operated, but not, however, until more of the creditors join their issues in this interest. For this purpose a petition will be circulated among those holding claims against the company. It is said if the Aurora plant is operated \$500,000 assets can be secured against the \$400,000 liabilities.

L. & R. Wister & Co. of Philadelphia are agents for the Pierpoint water-tube boiler in Eastern Pennsylvania, New Jersey, Delaware and Maryland.

Application has been made for the appointment of a receiver for the Standard Mfg. Company of Kansas City, Mo. The company were incorporated last spring for the manufacture of machinery of all kinds. The total indebtedness of the company is \$42,000 and their assets about \$80,000. The motion for receiver was sustained and A. G. Bodwell was appointed to that office and his bond fixed at \$25,000.

On account of the closing down of their rolling mill and the inability to procure iron for the making of pipe, the Niles Tool Works Company of Niles, Ohio, have closed down their plant until such time as the rolling mills resume operations.

The Indianapolis Bolt & Machine Company, Indianapolis, Ind., have finished repairing the building recently damaged by fire, and have also enlarged their shops, giving 20 per cent. more room. Ninety-five men are now employed, and orders are booked a considerable time ahead.

The Graham Twist Drill Company of Detroit, Mich., have put their employees on half time.

The foundry and machine shops of the Eureka Cast Steel Company, at Chester, Pa., have been destroyed by fire. As soon as the insurance can be adjusted the company will rebuild, as a number of pressing orders are now being filled. The cupola, open hearth furnace, drying and annealing furnaces were not injured, but the cranes were destroyed. The company carried an insurance of \$27,000, which will cover the loss.

William Wright's machine shop at Newburg, N. Y., is running on full time, but the foundry time has been reduced to three days a week.

The Coleman Foundry, at Morris, Ill., has closed for an indefinite period.

The Jones & Lamson Machine Company, makers of lathes, &c., and the Parks & Woolson Machine Company, both of Springfield, Vt., have started up after an idleness of two weeks undergoing repairs. The former company operate their plant night and day, their facilities being too limited to handle their orders promptly with one set of men.

The night shift, consisting of 72 men, has been laid off at the Lake Erie Engineering Works, Buffalo, N. Y. The day shift is still at work, and the boiler works are running with a full force on special orders.

The Michigan Forge & Iron Works, Detroit, Mich., employing 200 men, have shut down for an indefinite period, owing to lack of orders.

The Williamsport Machine Company of Williamsport, Pa., have notified their 100 employees of a reduction of 10 per cent. in wages.

The foundry of the printing press works of C. E. Cottrell & Sons, at Westerly, R. I., has resumed operations, after being closed for two weeks.

The Ohio Thresher & Engine Company of Upper Sandusky, Ohio, have gone into the hands of a receiver in order to prevent a sacrifice being made of the property by the creditors. The plant will be operated by the receiver.

The foundry department of the Farrel Foundry & Machine Company, Ansonia, Conn., is running three days a week.

The machine shop of the Carlisle Mfg. Company, Carlisle, Pa., has been closed down indefinitely.

At the plant of the Westinghouse Air Brake Company, at Wilmerding, Pa., commencing on Monday, the 14th inst., all the employees have been put on four days time of eight hours each. A large stock of brakes is on hand, and this, together with the very light demand for brakes from railroads, is the reason for the taking of this action.

Miscellaneous.

The factory of the Lalance & Grosjean Mfg. Company, at Woodhaven, L. I., and their rolling mills at Harrisburg, Pa., were closed down indefinitely on the 12th inst., throwing 1700 persons out of employment. Vice-President A. J. Cordier stated that the firm had been unwillingly constrained to take this course on account of the dullness of trade and diminution of the volume of orders, which did not justify them in piling up a greater amount of stock than is already held, especially in view of the possibility of tariff changes affecting their special productions.

The Michigan-Peninsular Car Company of Detroit, Mich., have greatly reduced their working force. Fifteen hundred men have been laid off by the two plants, while it is expected that both establishments will shut down about September 1, when orders now on hand have been filled. A reduction of the wages of about 1600 men still working has already been made.

The plant of the Geiser Mfg. Company, Waynesborough, Pa., manufacturers of engines, saw mills and threshers, has closed down indefinitely.

At Newburyport, Mass., the Newburyport Car Works have closed down for an indefinite period.

The car manufacturing works of Osgood, Bradley & Co., at Worcester, Mass., employing 190 men, have closed down for an indefinite period.

The Fuller & Johnson Mfg. Company of Minneapolis, Minn., makers of agricultural implements, have shut down their works indefinitely, and over 200 men are idle.

The Terre Haute Car Mfg. Company's plant, at Terre Haute, Ind., has been partially destroyed by fire. The loss is \$75,000 and covered by insurance.

It is estimated that between 1100 and 1200 men are idle in Bay View, Wis., while the entire working force will not figure up 500 hands.

The Pittsburgh Wire Works, at Wilmerding, Pa., have started up, giving employment to about 400 men. The company state that the works will be operated solely for the purpose of keeping the men employed.

Dispatches from Oakland, Cal., announce the destruction by fire of the Pacific Nail Works. The estimated loss is \$250,000, and the insurance \$175,000.

Frank K. Dunn was appointed receiver for the Bain Stove Mfg. Company of Charleston, Ill., on August 11.

TRADE REPORT

Eager watchers of the Iron markets note in some instances the first symptoms of a better feeling. It is probably natural that even the slightest evidence of a turn is given attention beyond its real significance. But affairs have been in so wretched a condition and bad news has been so overwhelming that any offset against them is hailed with delight.

Chicago is beginning to cultivate a hopeful view, largely based on the promise of a greater attendance at the fair. There has been some local buying of Pig Iron, and the expected purchases of Bars by those who follow the leadership of the largest consumers are beginning to be noticed.

It is reasonable to look to the markets east of the Allegheny Mountains for the first signs, because it is in that territory that relatively there is the greatest production among the rolling mills and steel works. In the West so many are still idle, undergoing repairs or awaiting settlement of wages questions, that what work originates in neutral territory goes to the Eastern mills. As our Philadelphia correspondent points out, the first step in the direction of an improvement must come in the shape of a larger volume of business. Since occasional transactions of magnitude are cropping up, the inference is drawn that the very worst is over. Thus there has been a sale of several thousand tons of Steel Billets at \$22.75, delivered.

There will have to be quite a prolonged period of activity, involving heavy sales of materials, before there is any prospect whatever of better prices. With Soft Steel in the commanding position which it now occupies, the attitude of the Steel Rail trade will continue a menace to any notable improvement. Last month the orders taken were only 50,000 tons, or one-third of what would be a decent monthly average, while shipments were about 90,000 tons. No notable improvement is hoped for during the balance of the year. Practically the manufacturers of rolling stock are in the same position as those dependent upon extension or renewal of permanent way, and Wheel foundries, Tire makers, Axle forges, Plate and Bar mills are the sufferers.

The Metal trade is feeling the depression keenly. Lake Superior Copper seems to be striving to beat the record of low prices made in the old days of the "Chili Bar sliding scale." It is now offering at 9½¢. Tin is weakening, having sold off during the week to 18.20¢ spot. Lead is dull at 3.30¢, and Spelter has dropped to 3.80¢, delivered. Tin Plates are dull, irregular and lower.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Pa., August 15, 1898.

The situation has not undergone much change from last week, although there are indications of a steadier feeling, and in some quarters a disposition to negotiate for new business. The amount actually closed is very trifling, however, so that there is still room for reserve before announcing any decided evidences of improvement. Nevertheless, things are looking better, and there are, doubtless, good grounds for believing that we have seen the worst and that whatever change there is will continue to be for the better. Prices of everything are at the lowest, but it is not reasonable to suppose that they can be any other. The first thing must be the offer of business, the next satisfactory arrangements as to payment, and then, if all goes well, it will be in order to quote better prices. The first stage has been reached, the second is passing off as well as could be expected, the third remains for the future developments. On the whole the past week may be regarded as not unfavorable compared with several immediately preceding, while in regard to the future the indications are mostly of a character that should encourage hopefulness.

Pig Iron.—The movement is unusually light, but in view of the general surroundings, it is perhaps as large as could be expected. Furnaces are not accumulating stock to any extent, neither are they making many new sales, deliveries being chiefly to fill former engagements. Inquiries are being made for additional quantities, but they have not resulted in much business, as neither side is particularly anxious to enter into new engagements. Consumers are not confronted with probabilities of heavy requirements, and as producers have cut down their output to small proportions, they too are in a position to await developments. Besides this, financial considerations have to be dealt with, the general outcome being a determination to follow conservative lines. Ultimately, it is believed that prices will make a sharp advance, as the curtailment in supply is bound to result in scarcity sooner or later. Things may run along in their present condition longer than people are inclined to expect, but be the time long or short, prices are liable to develop strength when the turn does come. Meanwhile sales continue to be made at about last week's figures, which are usually as follows for Philadelphia and equivalent points, with spot cash transactions at 25¢ @ 50¢ less, according to circumstances.

American Scotch, No. 1X...	\$18.00	@	...
American Scotch, No. 2X...	15.00	@	....
Standard Penna. (Lake Ore), No. 1x.....	14.75	@	\$15.25
Standard Penna. (Lake Ore), No. 2x.....	14.00	@	14.50
Standard Virginia, No. 1x...	14.50	@	14.75
Standard Virginia, No. 2x...	13.75	@	14.00
Virginia and Southern, No. 1x, Soft.....	14.00	@	14.25
Virginia and Southern, No. 2x, Soft.....	13.00	@	13.25
Standard Penna. and Virginia Forge.....	13.00	@	13.25
Ordinary Forge.....	12.50	@	12.75

Bessemer and Low Phosphorus Pig.—Business continues to be on a very limited scale, but as production is also at a low point, the supply is not in excess of the demand. Standard Bessemer is quoted at \$16 @ 16.25, delivered, and Low Phosphorus at \$18.25 @ \$18.50, with sales in small lots at prices named.

Steel Billets.—Consumers are doing so little that they have not found it nec-

essary to make new purchases. Manufacturers quote \$23.75 @ \$24, delivered, for Eastern Steel, and \$23.25 @ \$23.50 for Western, but no business of any account has been done, although there is little doubt that liberal concessions could be had from these figures—providing the right kind of an offer was made. So far there seems to be very little disposition to either buy or sell, as neither side is likely to offer terms which would be acceptable to the other.

Muck Bars.—Nothing doing, asking prices being \$22.50 @ \$23, delivered.

Bars.—There is nothing beyond the usual run of small orders, which are taken at extremely low figures, say 1.60¢ for first-class Iron in carload lots, city delivery, and 1.65¢ for broken lots. At interior points 1.50¢ @ 1.55¢ is quoted, but the supply of orders is much below what is necessary to keep the mills moving, even on single turn. At present there is nothing in sight to indicate any marked improvement, as consumption in many directions is gradually falling off, so that even with a little improvement in the general demand it will be hard work to sustain present quotations. Steel Bars are quoted 1.55¢ @ 1.75¢, according to quality.

Skelp.—There is a little more inquiry, and one or two sales, but the amount entered is not important, notwithstanding the fact that 1.50¢, delivered, is accepted for Grooved, with close terms of settlement.

Plates.—This branch of business keeps up fairly considering the general depression. Some of the mills manage to run pretty nearly full, others are doing comparatively little, but there is enough small business around to give at least some appearance of activity. Prices are dreadfully low, and on lots of a few hundred tons each, we should be afraid to say what would be accepted, but certainly any price hitherto paid would be gladly accepted to day, providing the order and the terms of settlement were in all respects gilt edged. Small lots are quoted about as follows:

	Iron.	Steel.
Tank Plates....	1.80 @ 1.85¢	1.70 @ 1.75¢
Bridge Plates.....	1.75	@ 1.80¢
Shell.....	1.90	@ 2.10¢
Flange.....	2.70 @ 2.90¢	2.20 @ 2.40¢
Fire Box.....	3.00 @ 4.00¢	2.50 @ 2.70¢
Special qualities.....	3.25	@ 3.75¢

Structural Material.—There is very little new business coming in, and specifications on old contracts are not sent in as promptly as could be desired, so that the feeling at the mills is rather gloomy. Some work has been postponed owing to the impossibility of financing for it, but with easier money this difficulty may soon pass away, but the outlook for new business is not good. Quotations for small lots are nominally as follows (delivered), but concessions could be had on good-sized orders: Beams, Channels or Tees, 1.80¢ @ 2¢, according to size of order; Angles, 1.75¢ @ 1.80¢; Universal Plates, 1.70¢ @ 1.75¢.

Sheets.—Mills have accumulated a good deal of stock, and there is no demand of any account. Manufacturers have cut down the working time to about one-half of what is usual at this season of the year. There is no such thing as regular market prices; all depends on how much is wanted, what quality, and how to be paid for. Small lots of best makes are quoted nominally as follows, but on large orders very liberal concessions can be obtained:

Best Refined, Nos. 14 to 20...2.75¢ @ 2.85¢
 Best Refined, Nos. 21 to 24...2.90¢ @ 3.00¢
 Best Refined, Nos. 25 to 26...3.15¢ @ 3.20¢
 Best Refined, No. 27...3.30¢ @ 3.40¢
 Best Refined, No. 28...3.40¢ @ 3.50¢
 Common, ½¢ less than the above.

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being ¼¢ @ ½¢ lower than above named:

Best Soft Steel, Nos. 14 to 16...2½¢ @ 2½¢
 Best Soft Steel, Nos. 18 to 20...2½¢ @ 3¢
 Best Soft Steel, Nos. 21 to 24...3½¢ @ 3½¢
 Best Soft Steel, Nos. 25 to 26...3½¢ @ 3½¢
 Best Soft Steel, Nos. 27 to 28...3½¢ @ 3½¢
 Best Bloom Sheets, ½¢ extra over the above prices.

Best Bloom, Galvanized, dis...70 and 5 %
 @ 70 and 10 %

Old Material.—The demand is very light, although business could be done if holders would accept four months' paper, but as this is difficult to negotiate it is thought best to hold on to the stock. Cash buyers, however, can obtain concessions from the usual asking rates, which are about as follows: Old Iron Rails, \$16 @ \$16.50, delivered; Old Street Rails, \$18 @ \$19; Old Steel Rails, \$13.50 @ \$14; No. 1 Railroad Scrap, \$13 @ \$14, delivered; \$7 @ \$8 for clean new No. 2 Light Scrap; \$11 @ \$12 for Machinery Scrap; \$10 @ \$11 for Wrought Turnings; \$7 for Cast Borings, and \$13 for Old Car Wheels.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, }
 CHICAGO, August 16, 1898. }

A notable feeling of hopefulness is springing up on all sides despite the general stagnation in trade and the rather dim prospect of an early improvement. Financial matters are getting into somewhat better shape, which inspires the belief that with easier money business will revive. The scarcity of currency reported in other sections of the country is not felt here. This is credited to the World's Fair, which is now attracting large numbers of people from remote distances, who bring currency with them.

Pig Iron.—Agricultural implement manufacturers are the only consumers now buying Pig to any extent. Some fair sales of Southern Coke have been made to them in the past week. General foundrymen are buying sparingly, but inquiries are being made which may lead to business soon. The usual carload trade has been interfered with by sales at very low prices of stocks held by bankrupt foundries. These stocks were not large and are now well out of the way. The Malleable Iron Work Syndicate are understood to be feeling the market on Lake Superior Charcoal and are likely to purchase heavily when they decide to close. Quotations are unchanged, but are still subject to concessions for prompt cash and immediate shipment. We quote as follows:

Lake Superior Charcoal.....	\$16.00 @ \$16.25
Local Coke Foundry, No. 1.....	13.50 @ 14.00
Local Coke Foundry, No. 2.....	12.75 @ 13.00
Local Coke Foundry, No. 3.....	12.50 @ 12.75
Local Scotch.....	14.00 @ 15.00
Ohio Strong Softeners.....	15.75 @ 16.25
Southern Silvery, No. 1.....	@ 14.50
Southern Silvery, No. 2.....	@ 14.00
Southern Coke, No. 2.....	12.00 @ 12.35
Southern Coke, No. 3.....	12.10 @ 12.35
Southern, No. 1, Soft.....	12.00 @ 12.35
Southern, No. 2, Soft.....	12.00 @ 12.25
Southern Gray Forge.....	11.50 @ 12.00
Tennessee Charcoal, No. 1.....	10.00 @ 10.50
Alabama Car Wheel.....	@ 13.85
Coke Bessemer.....	14.50 @ 15.00
Hocking Valley, No. 1.....	15.25 @ 15.50
Jackson County Silvery.....	16.50 @ 17.00

Bars.—The season contracts placed thus far fall much below their usual number. The very large consumers were expected to influence the others

when they bought, but for various reasons their example has been followed rather slowly. Every week, however, sees some business placed of this character. During the past week several such contracts were closed. They are running to Steel more than ever. Some buyers have taken all Steel this year who up to the present have exclusively used Iron. Prices on mill lots are a little stronger, although quotations are still 1.45¢ @ 1.50¢, half extras, Chicago delivery, on Bar Iron and 1.60¢ @ 1.65¢ on Soft Steel. Jobbers report a good demand from a class of consumers they do not usually reach when mills are running; but stocks are by no means broken and it will be some time at the present rate of consumption before they run low. Small lots from stock are selling at 1.70¢ @ 1.75¢ for Iron or Soft Steel.

Other Manufactured Iron and Steel.

—The demand for Beams and other Structural Material is still confined to small lots from stock, but the Calumet Club and the Iliion buildings are soon to be let and will arouse some interest in the trade. Tubes are quite active, as they are needed for repair work, which is more extensively done now than in good times, comparatively speaking. Light Sheets are very quiet, and local mills are still shut down for lack of business. Galvanized Iron is going out of warehouse freely, but mill orders are scarce. Merchant Steel has been more active recently, with numerous season contracts being closed, mainly for specialties, while Tool Steel is very quiet. Prices of mill shipments, Chicago delivery, may be quoted as follows: Beams, 1.75¢ @ 1.90¢; Tees, 1.95¢ @ 2.05¢; Angles and Universal Plates, 1.75¢ @ 1.80¢; Tank Steel, 1.75¢ @ 1.85¢; Shell Steel, 2.05¢ @ 2.15¢; Flange Steel, 2.20¢ @ 2.30¢; High Grade Fire Box, 2.75¢ @ 5¢; No. 27 Common Black Sheets, 2.80¢ @ 3¢; Juniata Galvanized Iron, 70 and 10 and 5 % discount; Sheet Copper, 30 and 35 % off, according to quantity; Smooth Finished Machinery Steel, 1.90¢ @ 2¢; Open-Hearth Spring and Smooth Finished Tire, 2¢ @ 2.10¢; Iron Finished Steel Tire, 1.70¢; Ordinary Tool Steel, 6¢ @ 7¢; Special Tool Steel, 12¢ and upward.

Rails and Track Supplies.—Rail orders are very few in number and small in size, but the South Chicago Works are able to continue in operation. Prices are unchanged at \$30 @ \$32, according to quantity. Spice Bars are still held at 1.60¢ @ 1.65¢; Track Bolts with Hexagon Nuts, 2.55¢ @ 2.60¢; Spikes, 1.85¢ @ 1.95¢.

Old Rails and Car Wheels.—Nothing is doing in Old Iron Rails, and it is hard to get a quotation. Consumers say \$14 is as much as they would give on a trading basis. Old Steel Rails are stagnant. Old Car Wheels could be bought at \$13.50, but there are no buyers.

Scrap.—Heavy Cast has been sold at \$8, but no transactions are reported in Wrought. Nominal selling prices @ net ton are as follows: No. 1 Forge, \$10.50; No. 1 Mill, \$8; Sheet Iron, \$5; Pipes and Flues, \$7.75; Axles, \$18; Horseshoes, \$12; Fish Plates, \$14.50; Spikes and Bolts, \$12.50; Cast Borings, \$5.25; Wrought Turnings, \$7.25; Axle Turnings, \$9; Heavy Cast, \$8 @ \$9; Stove Plate, \$8; Malleable Cast, \$8; Mixed Steel, \$9, gross ton; Leaf Steel, \$16.

Metals.—Lake Copper in carloads is now quoted 10.25¢; Casting Copper, 9.75¢. Quite a lot of Scrap Copper

has recently been sold here for export to Germany by the Swarts Iron & Metal Company. Spelter is quoted 8.75¢.

E. S. Jackman, 901 The Rookery, Chicago, has been given general supervision of Park, Bro. & Co.'s Western business, comprising the branch houses at Detroit, Chicago, St. Louis and Denver. Each branch house now has a manager, whose duties are by no means interfered with, nor are their powers curtailed, by this arrangement, but they are thus brought into harmonious relations with one another, and conflicts of jurisdiction over new business are avoided. Supervision of this character has heretofore been exercised directly from headquarters in Pittsburgh. The appointment thus made is a recognition of the ability shown by Mr. Jackman in conducting the business of branch Steel houses. This new arrangement, which Mr. Jackman has personally made, will not interfere with the business of the Edwin S. Jackman Company in handling the railroad business of Park, Bro. & Co.

St. Louis.

(By Telegraph.)

Office of *The Iron Age*,
 Bank of Commerce Building,
 ST. LOUIS, August 16, 1898.

Pig Iron.—There is no practical change to note either in price or demand. Consumers are satisfied to follow the policy adopted some two months back of buying only as their needs demanded. This they continue to do, and are not tempted to change this policy even by the offer of lower prices. Notwithstanding that there is no increased business to report, there is steadily gaining ground the opinion that the situation is improving. While prices are low and only a moderate business is doing, yet the feeling of nervous anxiety concerning the financial condition of every customer who orders a bill of goods is being dispelled, and while this in itself does not amount to very much, it will gradually lead to a general improvement throughout the entire line, and a gradual restoration of confidence will naturally ensue. The tremendous decrease in production has opened the eyes of consumers to the fact that they may yet find themselves face to face with a scarcity; at the moment this, of course, is not likely to happen, but with a gradual improvement in the demand and a continued decrease in production, the situation will be radically different. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry.....	\$13.25 @ \$13.50
Southern Coke, No. 2 Foundry.....	11.75 @ 12.00
Southern Coke, No. 3 Foundry.....	11.25 @ 11.50
Southern Gray Forge.....	10.75 @ 11.00
Southern Car Wheel.....	18.00 @ 19.00
Lake Superior Car Wheel.....	16.75 @ 17.25
Ohio Softeners.....	15.75 @ 16.50
Missouri Charcoal, No. 1 Foundry.....	12.75 @ 13.25

Bar Iron.—The demand for Bar Iron shows some slight improvement. The principal feature noticeable is the broken condition of stocks in jobbers' hands, which enables them to get full prices on sizes most needed and which are at the same time scarce. Mills are not urging trade, but sell largely for cash. Mills quote 1.45¢ @ 1.50¢, f.o.b. cars East St. Louis, according to the size of the order. Jobbers ask 1.60¢ for small lots from store.

Barb Wire.—There is no improvement to note in Barb Wire. The demand is light and while \$2 is the nominal quotation for carload lots of Painted this price is shaded and \$1.90 @ \$1.95 is quoted. Galvanized commands the usual 40¢ per hundredweight advance over Painted.

Wire Nails.—The demand for Wire Nails is extremely light and prices unchanged. We hear considerable regarding an agreement to be made among the Nail mills, but at this writing nothing definite has been done. Jobbers complain that mills are unable to fill their orders in full, being short on a large number of sizes. This will doubtless mean an early resumption by the mills. Mills quote \$1.50 in carload lots to jobbers.

Rails and Track Supplies.—There is no demand for Steel Rails, and prices are purely nominal at \$30.50 @ \$31.50, according to quantity. Track Supplies are unchanged. Splice Bars, 1.70¢; Spikes, 1.90 @ 2¢; Bolts, Square Nuts, 2.50¢; with Hexagon Nuts, 2.60¢. Old Iron Rails are quoted at \$16.

Pig Lead.—Business fails to show any increase, although prices are a trifle firmer at 3 07½¢, at which price some few sales are reported. The consumptive demand is light, however, and any improvement in price is hardly probable until the demand picks up.

Spelter.—Another break is noted in this metal, which is now selling at 3.50¢. Several carloads having been sold at this price, there does not seem to be any reason why lower prices should not prevail, as the stocks of unsold Spelter are heavy and the demand is lighter than it has been for years.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts.,
CINCINNATI, August 15, 1893.

The Pig-Iron market grows worse, if possible. The volume of business is considerable and there is little inquiry for round lots of any grade. There have, however, been some sales of No. 2 Foundry for delivery monthly during the remainder of this year at \$8.50 per ton, f.o.b. Birmingham, but not to any large extent, and while furnaces are indifferent about selling at this price, there are few buyers. This Iron has been sold for spot cash at 25¢ per ton less, but while any price might be accepted by a needy furnace for cash in hand, there appears to be less urgency to sell, probably because there is less Iron being made, but there is an ample supply for the greatly reduced demand. There have been some sales of the lower grades of Tennessee and Alabama Charcoal Iron at reduced prices, but there is no demand for Car-Wheel Iron. The Iron factors are generally devoting their energies to bringing their customers over their financial difficulties, for collections are reduced to almost nothing and the great bulk of the maturing paper has to be renewed. In this district there are no buyers of Iron beyond carload lots and quotations are not much better than nominal. We quote as follows:

Foundry.

Southern Coke, No. 1.....	\$12.75 @	\$13.00
Southern Coke, No. 2.....	11.25 @	11.50
Southern Coke No. 3.....	10.75 @	11.00
Ohio Soft Stone Coal, No. 1....	15.50 @	16.00
Ohio Soft Stone Coal, No. 2....	14.50 @	14.75
Lake Superior Coke No. 1.....	15.00 @	15.25
Lake Superior Coke No. 2.....	14.00 @	14.25
Hanging Rock Charcoal, No. 1..	18.50 @	19.00
Hanging Rock Charcoal, No. 2..	17.50 @	18.00
Tennessee and Alabama Char-		
coal, No. 1.....	14.00 @	14.25

Tennessee and Alabama Char-		
coal, No. 2.....	13.00 @	13.25
<i>Forge.</i>		
Gray Forge.....	10.25 @	10.50
Mottled Coke.....	10.00 @	10.25
<i>Car Wheel and Malleable Irons.</i>		
Standard Southern Car Wheel	17.75 @	18.00
Lake Superior Car Wheel and		
Malleable.....	17.00 @	17.25

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building,
PITTSBURGH, August 15, 1893.

Nothing has occurred during the week that would show that there has been any improvement in the situation, even to the slightest degree. Business is being restricted more and more and terms are getting closer to a cash basis, many concerns refusing to sell only on 10 days or 2% off for cash. There has been no material change in prices during the week, and there is not enough business being done to thoroughly test the market. There is still a woful lack of confidence between buyer and seller and until this has been removed no improvement can be expected.

Pig Iron.—There is practically no market, a few small sales taking place occasionally to meet immediate requirements of buyers. Pig Iron makers are averse to selling their product on long time, and buyers have not the money to pay for it on delivery or in ten days, and the result is that production has been reduced very largely already by both Pittsburgh and valley furnaces, and it will be still further cut down before this month is out. Bellaire Furnace of the Bellaire Nail Works was banked this week, as the firm have enough Iron to run them for some time after their Steel plant has resumed. Not since the long Coke strike of two years ago or more has the production of Pig Iron in this district been so low as it is at the present time. Notwithstanding this, it is safe to say that production is still considerably ahead of consumption, so that further restriction in production is absolutely necessary. Furnace operators are not pushing their Iron on the market, but when a chance presents itself to turn some Iron over for cash, it is done, even though the buyer has come pretty close to naming the price. Foundry and Mill Irons are dull and neglected, due to the closing of so many mills and to the curtailing of operations among the foundries. We quote as follows:

Neutral Gray Forge.....	\$11.75 @	\$12.00, cash.
All-Ore Mill.....	12.00 @	12.25 "
Bessemer Pig.....	12.50 @	12.75 "
No. 1 Foundry.....	13.00 @	13.25 "
No. 2 Foundry.....	12.00 @	12.25 "
Charcoal Foundry No. 1.....	15.00 @	16.00 "
Charcoal Foundry No. 2.....	14.00 @	15.00 "

Reports are going of sales of Bessemer and Gray Forge at less than the above prices, but if made, they were under forced conditions and do not represent actual ruling prices.

Ferromanganese.—We are not advised of any transactions in this market either in foreign or domestic for several weeks past, and we make nominal quotations of \$57 @ \$57.50 for 80%, f.o.b. cars Pittsburgh.

Billets.—There is no improvement in demand and production has been further restricted by the shutting down for a temporary period of the Duquesne Steel Works, thus taking out of the market very close to 1000 tons per day. There are only two Steel plants in this city that are doing anything at all, and these are not being operated to anything like their full capacity. In the Wheeling district everything is closed, but it

is intimated that one or two concerns will probably start up on single turn within a very short time. Under existing conditions, it is next to impossible to correctly quote the market, makers asking all the way from \$20.50 to \$21 at mill, according to order and terms of payment

Structural Material.—The situation is unchanged from that noted last week. Of the three concerns in this city making Structural Shapes, one is closed and the other two are operating their plants to half capacity or less. Some old contracts are yet unfilled, and specifications on some of these have come in within the last week or two. There is very little new work in sight, and the call now is for small lots altogether. While we repeat quotations of last week, it is probable that for a good-sized order with satisfactory terms to seller these would be shaded somewhat. We quote as follows: Beams up to 15 inches, 1.50¢ @ 1.60¢, f.o.b. cars Pittsburgh; Angles and Universal Plates, 1.60¢ @ 1.70¢; Tees, 1.60¢ @ 1.70¢, and Z-Bars 1.60¢ @ 1.70¢.

Muck Bars.—We are not advised of any transactions during the past week. Considerable Muck Bar made by concerns west of Pittsburgh has been sold in this market, but this has been withdrawn to considerable extent. Some sales of this Bar were made as low as \$21.50, Pittsburgh, while best grades of city-made Bars are held at \$22.50, delivered at buyer's mill.

Rods.—As noted elsewhere, a number of Wire-Nail concerns have started up their plants on single turn, and should they continue in operation it will probably have the effect of improving the demand for Rods. In the absence of sales we quote the market at \$27.50, Pittsburgh.

Plates.—Business seems to be getting duller as far as demand is concerned, and during the week one large maker in this city closed down temporarily, and another is operating to about half capacity. Business coming in falls far short of being sufficient to keep the mills in full operation. We repeat quotations of last week, as follows: Tank, 1.50¢ @ 1.60¢; Shell, 1.65¢ @ 1.75¢; Flange, 1.75¢ @ 1.90¢; Ordinary Five Box, 2.25¢ @ 2.50¢; Special, 3¢ @ 3.50¢.

Merchant Steel.—There is nothing new to report this week, the demand being very light, with no immediate prospects of improvement. It is not expected that the action of the Linden Steel Company in asking for an extension will seriously affect the market one way or the other. We quote Open-Hearth Spring and Tire at 1.90¢ @ 2¢, and Machinery at 1.90¢; Tool Steel we quote at 5½¢ and upward, according to quality, and special brands at 15¢ and upward.

Wire and Cut Nails.—It is stated that the Wire-Nail manufacturers have about completed the pooling arrangement to which reference has already been made. Standard prices have been established in the different large cities, the price in carload lots from Pittsburgh and Cleveland being put at \$1.50, going into effect to-day (Tuesday). The Consolidated Steel & Wire Company have resumed operations, but not to full capacity, while the Salem Wire Nail Company have started up the Salem works on single turn. Their Findlay factory is still idle. There is a fair demand for Cut Nails, with prices un-

changed at \$1.05 base in carload lots at factory.

Pipes and Tubes.—Beyond a fair demand for the smaller sizes of Pipes, there is no business doing in this department. The scarcity of money has prohibited natural gas companies from laying new mains, and as a result there is no demand for the larger sizes of Pipe. However, it is expected that with the development of new territory and easing up in the money market there will be a good demand for the larger sizes of Pipes along toward fall. Part of the plant of the American Tube & Iron Company at Middletown, Pa., has been started up, while at the works at Youngstown, Ohio, a general sorting up of sizes is going on for the purpose of filling orders, although no Pipe is being made as yet at this plant.

Wire—There is more activity among the Wire mills, and we are advised that there is a very fair demand, confined to carload lots and less. The shut down of so many plants during July and part of August has reduced stocks very much, and prices are considerably firmer. We quote the market at \$2.32½ @ \$2.35 for Four-Point Galvanized, and \$1.92½ @ \$1.95 for Painted, in carload lots. Plain Wire is ruling at \$1.60 in carload lots, and \$1.80 in less quantities.

Sheets.—The demand continues quiet, and, as noted last week, none of the mills are in full operation, while some are closed entirely. A good many contracts made early in the year for shipment about this time have been shaved down fully one half, while some few have been countermanded altogether. We quote Common Box Annealed Sheets at 2.45¢ for No. 24, 2.55¢ for No. 26, and 2.65¢ for No. 27. For Soft Steel Sheets from 5¢ to 10¢ additional per 100 lb on above prices is charged. There is a good demand for Galvanized Sheets, and we quote these at 70 and 10 and 5 % discount in carload lots.

Bars.—Trade does not seem to improve any, and there is no disposition being shown among the mills now idle to resume operations. There are probably a dozen concerns in this city operating their plants to half capacity or less, while in the Mahoning Valley district everything is closed down with one or two exceptions. A scarcity is reported in certain sizes, and on the whole prices are showing a firmer tendency. We quote Steel Bars at 1.50¢ @ 1.55¢, Bar Iron extras. In the Mahoning Valley Bars are held at 1.40¢ @ 1.45¢, half extras, at mill.

Coke.—For the week ending August 5 shipment of Coke from the Connells-ville region decreased about 1000 cars, and production fell almost 20,000 short of the previous week, while a reduction in the number of active ovens was also made. At the present time not more than one third of the ovens in the Connells-ville region are in blast, and a number of these will be blown out within a short time unless there is an improved demand for Coke. For the week ending on the above date there were 6735 ovens in blast and 10,598 idle, with a total estimated production for the week of 49,510 tons. Compared with the production of the previous week this was a decrease of 19,822 tons. On account of the blowing out of so many blast furnaces there is little or no demand for Furnace Coke. It is still being offered at \$1.25 in tons of 2000 lb, f.o.b. cars in Connells-

ville region. Foundry Coke is being offered at \$1.50 to dealers and \$1.65 to consumers.

Boston.

Office of *The Iron Age*, 146 Franklin St., }
BOSTON, August 15, 1893. }

The feature in the Iron market is a continuation of the extreme caution previously noted. Foundrymen, machinists and manufacturers are allowing their stocks of material to run very low, anticipating a shut down of more or less duration. On the other hand, there are occasional orders that they have not anticipated; these very orders coming from the extreme conservatism that other branches of the trade have been practicing. Business is not wholly suspended, in the working of Iron, but everybody seems to talk as though they were meaning to be ready to stop work if the condition of affairs should demand a suspension. In the meantime it is pretty certain that there is some improvement to note financially, and that nothing is wanting but a return of confidence to make a brisk market for merchandise.

Pig Iron.—Dealers and agents note a very small business in Pig Iron. The foundrymen are giving few new orders, and in some instances they are glad of any sort of an opportunity to "stave off" the delivery of Iron bought some time ago, or even to cancel the order altogether. Still, the foundries are not all closed down, but it is evident that those running are drawing from stocks of Iron bought previously, and not replenishing these stocks, for the reasons mentioned above. Southern Pig Iron, ex-dock in Boston, is quoted at: No. 1, \$15 @ \$15.50; No. 2, \$14 @ \$14.50; No. 3, \$13 @ \$14. Virginia Iron is in some demand, with the quotations at \$15.50 for No. 1, and \$14 @ \$14.50 for No. 2. Pennsylvania Iron is very dull in this market. Quotations for Iron at shipping port are at: No. 1, \$14.50 @ \$15; No. 2, \$13.50 @ \$14; Gray Forge, \$13 @ \$13.50. There is a quiet trade in Ohio Irons, with this market quoted at \$17 @ \$17.50 for Iron laid down in Boston.

Bar Iron.—The market is quiet in Bar Iron. Manufacturers are not calling for Iron, fearing a shutting down of their works. At the same time the New England rolling mills have a few orders on which they are at work, but it does not look favorable for new orders. New England Old Material Bars are not changed in prices, in spite of the dull trade, but are nominally quoted at 1.60¢ @ 1.65¢ from mill; from store, 1.65¢ @ 1.75¢. Best Bars, from Puddled Iron, continue to be quoted at 1.80¢ @ 1.90¢ from mill, and at 1.95¢ @ 2¼¢ from store. Norway Bars are quiet and steady at \$66 @ \$70 ¢ ton, including Shapes.

Building Iron.—Trade is light in Building Iron. Buildings are being completed, but no new buildings are being projected at present. On the contrary, several schemes involving a good deal of Iron have lately been suspended for the present. The bridge builders are finishing up old contracts, and this will take some of them till well into the autumn, but they are making no new contracts. The quotations are nominally unchanged at: Beams and Channels, from mill, 1.85¢ @ 1.95¢; from store, 2¼¢ @ 2½¢; Tees, 2.10¢ @ 2¼¢ from mill; from store, 2.40¢ @ 2.60¢; Angles, 1.80¢ @ 1.90¢ from mill; from store, 2¼¢ @ 2.35¢.

Steel, Steel Plates and Steel Rails.—The demand for Merchant Steel is rather irregular. At first impression it would seem that trade must be extremely dull, and this is true, so far as manufacturers of Iron goods are concerned. But the stopping of cotton and woolen mills and other factories has made a good deal of repairing for the machinists, and in some cases they have been caught without the material on hand. In one case a big machine-shop concern have been obliged to take a large amount of cold-rolled shafting for one of these repair jobs, not daring to wait for the shafting to be turned up on their own lathes. This shafting was sold by a representative house here. But in other cases important orders for Iron and Steel, or what was promising to develop into orders, have been dropped. One prominent concern of car builders were figuring on something like 1000 cars, to be built at once, and were ready to negotiate for the Iron and Steel. But the railroad shut the order short off the other day. Later it has ordered 100 cars of the 1000. The quotations on Steel are nominally steady at: Bessemer Steel, 2¢ @ 2.10¢; Tire and Sleigh Shoe, 1.90¢ @ 2¢; Sheet, 2¼¢ @ 2½¢; American Cast, 6¼¢ @ 7¢; English Cast, 13¼¢ @ 15¢; American Steel Rails, \$29 at mill. It may be interesting to note that the Pottstown Iron Company furnished the Steel for the construction of the cup-defending yachts. The Steel for the "Jubilee" was furnished by the Boston office of that company to the Geo. Lawley & Sons Corporation, builders. The other boats were built by the Herreshoffs, and their orders for Steel were placed with the New York office of the above Iron company. Plate Iron is quoted at: Tank, 1.80¢ @ 1.90¢; Shell, 1.85¢ @ 1.95¢; Refined, 2.05¢ @ 2.10¢; Fire Box, 2¼¢ @ 2½¢.

Nails.—There continues to be a fair trade in Nails, considering the dullness of other branches of the Iron industry. Prices are very steady. Cut Nails, both Iron and Steel, are quoted at \$1.40 ¢ keg in round lots, and at \$1.45 @ \$1.50 for small lots. The recent advance in Wire Nails is claimed to be sustained, the jobbers here asking \$1.75 ¢ keg.

Pipe and Tubes.—The trade in Pipe is better than it is in some branches of Iron. Water works planned early in the season are being pushed to completion. The laying of new Pipes for the Brookline Gas Company in Boston is taking a good deal of Pipe. Besides there is considerable doing in the way of steam fitting in the new buildings that have been erected this season. The Pipe card is not changed; neither are the manufacturers pressing the sale of Pipe as hard as might be expected. The suspension of some of the Tube mills renders the position of Tubes fairly firm, with 3-inch and above quoted at 67½ % off from the list, and 2¼-inch and under at 65 % off.

Scrap Iron.—The market on Scrap Iron is very dull. The possible stopping of some of the rolling mills that are users of Scrap does not have a strengthening effect on the market. No. 1 Wrought is still quoted at 50¢ @ 55¢, with choice selections and Old Horseshoes quoted at 55¢ @ 60¢. Machine Shop Cast Scrap is quoted at 50¢ @ 55¢ for the best lots. Light Iron is dull at 30¢ @ 40¢, as to quality. Cast Turnings and Borings are quoted at 25¢ @ 30¢, with Wrought at 30¢ @ 35¢.

Cleveland.

CLEVELAND, OHIO, August 14, 1893.

The business situation has been slightly improved by the almost universal adoption by the manufacturers and business firms of the system of paying in checks instead of currency, and by the rule adopted by all local banks requiring 60 days' notice before deposits can be withdrawn. Business is dull, but Cleveland has fewer failures than any city of its size in the Union, and there is less distress here. This is in a measure accounted for by the fact that not a single banking institution in Cleveland has manifested any disposition to suspend payments. This has served to preserve confidence. There was talk of a meeting of the city's unemployed, but the idea was discouraged even by the workmen themselves. Wages are being cut, and it is said to be due to this fact that some business in the Pig-Iron market can be recorded this week.

Iron Ore.—An indication of the present condition of the market may be gathered from the fact that vessel owners—not all of them, it is true, but a large number—are jumping at the chance to carry Ore from Escanaba to Ohio ports at 40¢ per ton and from Ashland at 50¢. This is something of a decline from the rates talked of at the beginning of the season, viz.: Escanaba 95¢, Marquette \$1.10 and Ashland \$1.25. Only a very small amount of Ore has come down from Lake Superior since our last report. Many Ore-carrying vessels have tied up for the season—an unprecedented event in midsummer. Only a very small amount of Ore was sold during the past week, a few thousand tons of Bessemer Hematites going at \$3.50 @ \$3.70, and some non-Bessemer at figures below \$2.75 per ton. The movement to the furnaces was also weak, but little effort being made to relieve the docks of their burden. Reports are received of more mines closing down and of cuts in wages. Just where all this is to end is something very puzzling to mine owners and dealers alike.

Pig Iron.—The market is far from brisk, although some sales are reported. We hear of a sale of 2000 tons of Bessemer at \$12.75, Cleveland, and of a smaller amount of Foundry Iron, No. 1, at \$13.50. The demand, however, is weak and uncertain. There is said to be some inquiry for Charcoal Iron. It is believed that the great reduction in production will soon have an effect upon the market. Nominal quotations are:

Nos. 1 to 6 Lake Superior Charcoal.....\$15.75 @ \$16.00
Nos. 1, 2 and 3 Bessemer, per ton.....13.00 @ 13.15
No. 1 Strong Foundry, per ton.....13.50 @ 14.00
No. 2 Strong Foundry, per ton.....12.75 @ 13.00
No. 1 American Scotch, per ton.....14.00
No. 2 American Scotch, per ton.....13.00
Mahoning and Shenango Valley Neutral Mill Irons, per ton.....11.50 @ 11.75
Mahoning and Shenango Valley Red Short Mills, per ton.....11.75 @ 12.00

Louisville.

LOUISVILLE, KY., August 14, 1893

There is no selling of Iron, buyers refusing to purchase, the condition of the money market being such that consumers find it impossible to meet in the ordinary way paper already out. Owing to the conditions there is great uncertainty as to the future, and buyers will not purchase or engage Iron for future consumption. This is more true of the West than those portions of the East supplied by Western houses, as there is a fair demand for Southern Iron at those points, and buyers state that

owing to the shutting down of many works those running have an abundance of orders for finished material. There is no demand for Car-Wheel Iron, as most of the car companies have shut down. One of the largest of the Western pipe companies will also close down this week. We quote for cash, cars, Louisville:

Southern Coke, No. 1 Foundry.....\$12.75 @ \$13.25
Southern Coke, No. 2 Foundry.....11.50 @ 12.00
Southern Coke, No. 3 Foundry.....11.00 @ 11.25
Southern Coke, Gray Forge.....10.50 @ 10.75
Southern Car Wheel.....17.50 @ 17.75
Southern Charcoal, No. 1 Foundry.....15.00 @ 16.00

Metal Market.

Copper.—Contraction of work at various large brass manufacturing establishments and in other lines of industry in which Copper is more or less extensively consumed (the outcome of general trade depression) has effectually offset the best efforts of producers to maintain prices by restricting the output. In other words, the demand has fallen off quite as much or more than the supply. Hence, any effort to expedite business leads to weakness in prices, and, while not numerous, such efforts have been sufficient to keep the market weak and unsettled. Lake Superior Ingot is, at present, freely offered at 9½¢. Other varieties are relatively as low, say about 9¼¢ for Electrolytic and 9¼¢ for common casting stock.

Pig Tin.—Prices for Pig Tin have dropped about ¼¢ per pound under the weight of combination of unfavorable circumstances, not the least among which is pressure by the "bear" interest, which, apparently, misses no opportunity to take advantage of every circumstance that may be turned to their account. New speculative deals have been few in number and invariably on a small scale. Purchases for trade and consumptive account seem also to have been below the average, although sufficient to make quite an impression upon spot supplies. On late dealings the price for spot stock dropped to 18.20¢. August delivery went quite as low and September was offered at 18.35¢. Cables to the Metal Exchange noted that Straits shipments during the first half of August were 1000 tons to Great Britain and 800 tons to the Continent, against a total of 2025 tons during the corresponding period last year.

Pig Lead.—There has been only a very moderate business during the past week. The demand was slow also, and the offering reserved. Such as it was, the little business effected went at about 3.80¢, indicating a fair undertone of steadiness, despite the trying conditions of unusually dull trade.

Spelter.—There has been a drop in price to 3.80¢ @ 3.85¢ for standard Western brands, delivered here or at common point. Comparatively little business went through at the decline, since narrow consumption and monetary conditions, rather than the matter of price, continue to be the guide to operations in a great measure.

Antimony.—Demand continues moderate and prices are rather soft, with quotations on round lots about: 9½¢ @ 9½¢ for Hallett's, 10½¢ @ 10½¢ for L.X., and 10½¢ @ 10½¢ for Cookson's.

Tin Plate.—Dullness is still the conspicuous feature of the market. There are hardly any inquiries for futures and spot stock in other than small quantities is not wanted. Prices are unsettled and irregular, with a decided leaning in buyers' favor, particularly in the in-

stance of ordinary cokes. Spot quotations are about as follows: Coke Tins—Penlan grade, IC; 14 x 20, \$5.25; J. B. grade, do., \$5.30; Bessemer full weight, \$5.25; light weights, \$4.85 @ \$4.87½ for 100 lb, \$4.80 @ \$4.82½ for 95 lb, \$4.75 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60; Siemens Steel, IC basis, \$5.65; IX basis, \$6.75. Charcoals—Melyn grade, IC, \$6.35 @ \$6.37½; Crosses, \$8; Allaway grade, IC, \$5.60; Crosses, \$6.80; Grange grade, IC, \$5.70; Crosses, \$6.85. Charcoal Terns—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.35; do., 20 x 28, scarce; Dean grade, 14 x 20, \$5.30 @ \$5.37½; do., 20 x 28, \$10.50 @ \$10.60; D. R. D. grade, 14 x 20, \$5.10 @ \$5.15; do., 20 x 28, \$10.10; Alyn, 14 x 20, \$5.32½ @ \$5.35; do., 20 x 28, \$10.40; Wasters—S. T. P. grade, 14 x 20, \$4.87½; do., 20 x 28, \$9; Abercane grade, 14 x 20, \$4.87½; do., 20 x 28, \$8.90.

The monthly production of Copper in the United States since July, 1892, has been as follows, the first column giving the aggregate returns from the reporting mines, which include the principal lake, Montana and Arizona producers; the second being the metal from pyrites and from a number of smaller outside sources, being estimated:

American Product.			
	Reporting mines.	Outside sources.	Total Gross tons.
1892.	Gross tons.	Gross tons.	
July.....	9,294	924	10,218
August.....	10,807	870	11,677
September.....	9,710	994	10,704
October.....	9,668	1,239	10,907
November.....	9,888	1,036	10,924
December.....	9,872	1,174	11,046
Total six months.....	59,239	6,267	65,526
1893.			
January.....	9,187	989	10,176
February.....	8,213	1,042	9,245
March.....	9,065	1,321	10,386
April.....	11,775	1,042	12,817
May.....	12,706	1,042	13,748
June.....	11,524	1,042	12,566
Total six months.....	62,470	6,478	68,938
1893.			
July.....	11,049	1,042	12,091

The product of the foreign reporting mines and the United States exports were as follows:

Foreign reporting mines.		United States exports.	
1892.	Gross tons.	1892.	Gross tons.
July.....	6,358	July.....	3,450
August.....	6,888	August.....	1,545
September.....	5,478	September.....	1,458
October.....	6,476	October.....	3,114
November.....	6,789	November.....	3,897
December.....	7,666	December.....	4,486
Total six months.....	39,655	Total six months.....	17,980
1893.		1893.	
January.....	5,736	January.....	3,171
February.....	6,762	February.....	1,815
March.....	6,896	March.....	2,334
April.....	6,913	April.....	3,450
May.....	6,806	May.....	4,482
June.....	7,935	June.....	5,109
Total six months.....	41,048	Total six months.....	20,361
1893.		1893.	
July.....	5,297	July.....	7,181

David T. Day, chief of the Division of Mining Statistics and Technology of the United States Geological Survey, has issued a preliminary report by C. Kirchhoff on the production of Spelter for the first six months of 1893. The figures are as follows:

Production of Spelter by States (Short Tons).

States.	First six months. 1892.	First six months. 1893.
Eastern and Southern States.....	6,901	7,380
Illinois and Indiana.....	15,433	16,427
Kansas.....	14,161	13,269
Missouri.....	8,954	8,718
Total.....	45,499	45,794

It will be observed that there has been only a small increase.

Financial.

On the whole, there has been a moderate improvement in the general situation during the week under review. August has thus far witnessed an extraordinary expansion in the available currency, the imports and engagements of gold to date being not less than \$28,000,000, of which \$14,000,000 arrived during the week of August 6 to August 12 inclusive, while \$9,000,000 additional has been engaged and \$3,000,000 is afloat, due to arrive at an early date. In addition thereto over \$17,000,000 of notes have been ordered from the Treasury Department by national banks throughout the country, and the hope is expressed that the Voorhees bill, permitting the national banks to issue circulation up to the limit of their deposits of United States Government bonds up to par, will soon be passed, and thus bring additional relief. Since the 1st inst. there have also come into the money markets about \$4,000,000 from silver purchases by the Government. Altogether this represents a total of nearly \$50,000,000.

In spite of the heavy gold imports, the weekly bank statement on Saturday was decidedly disappointing. Instead of a substantial increase in the surplus reserve, there was a decrease of over \$2,500,000. The explanation is made that the banks are really in a stronger position than is indicated by the statement, because the bulk of the gold which they received arrived late in the week and, therefore, did not affect the averages very much. Another explanation of this seeming anomaly is that the banks on their own account have not received and held the imported gold at all, but that the specie bought abroad some time ago by the banks has been repurchased here at a premium by savings banks, trust companies and private firms and individuals. The fact that money in large quantities was loaned at 6% by others than the banks, and chiefly by the trust companies, indicates that this has been the case.

An increasing use is noticed throughout the country of certified checks for small sums, which circulate in the locality of their issue and take the place of the small bills which have become so scarce. This, the imports of gold, the issue of Clearing House certificates in different financial centers, the taking out of more circulation by the national banks, all tend to counteract the hoarding which has been going on for so long. The high premium at which currency has sold at different times during the past week has had the effect of bringing out a good deal of hoarded money, so that at one time late last week the premium on currency practically disappeared. It has, however, risen again early this week, selling on Tuesday at 2 @ 2½%. The premium on gold in transit, however, has dropped ½ of 1%, which caused a weakening in the sterling exchange of rates. The issue of Clearing House certificates has now reached a total of \$39,000,000 for the New York banks and \$10,500,000 for the Boston banks, although the statement is made by apparently good authority that \$15,000,000 of Clearing House certificates issued by New York banks have never been used.

Among financiers in New York there is a growing sentiment of uneasiness over the delay by Congress in taking action on the Silver Purchasing act and on the strength which the opposition to an unconditional repeal is developing.

The money market has been fairly steady during the week, call loans ranging between 3 and 5%, while time loans have been in demand at 6% on choice securities, with little accommodation offered. Commercial paper has been in poor request, brokers quoting nominally first class double-named, 60 days, 10 @ 12%, and 4 months, 10 @ 12%. Single-named first-class paper commands 12 @ 15%. Foreign exchange has fluctuated considerably during the week, and closes with actual business at \$4.81 @ \$4.82 for 60 days' bills, \$4.85½ @ \$4.86 for demand and \$4.80 @ \$4.81 for commercial. Domestic exchange is quoted as follows: Savannah—Buying, ½ discount; selling, par to ½ premium. Charleston—Buying, ½; selling, par. New Orleans—Commercial, \$7.50 dl. count; bank, nominal. Boston—New York funds, 75¢ @ \$1.50 premium for cash. Philadelphia—In demand at 1½% premium. San Francisco—Sight, 5; telegraph, 15. St. Louis—\$6 discount. Chicago—\$15 discount.

Business at the Stock Exchange has been dull, the feature of the week being the continued selling of Northern Pacific securities, the cause of which was revealed by the announcement on Tuesday that the company had been forced to go into receivers' hands. This event is regarded as particularly unfortunate, since the company had a large floating indebtedness, which must be embarrassing to many creditors, among whom may be quoted sellers of supplies and materials.

During the week the fluctuations have been relatively unimportant, prices of leading stocks comparing as follows on the closing of Thursday, August 10, and the closing on Wednesday, August 16:

American Sugar Ref.	73 ¾ to 73 ½
Atchison, Topeka & S. Fe.	15 ¾ to 15 ½
Balt. & Ohio	65 to 65 ¼
Chicago Gas	51 ¾ to 49 ¾
Chic. & N. W.	96 ¼ to 95
C. B. & Q.	78 ¾ to 76
Chicago, Milwaukee & St. Paul	54 to 52 ½
Chicago, Rock Island & Pacific	59 ½ to 57 ½
Del., Lack. & W.	137 to 135
Genl. Electric	45 ¾ to 42 ½
Lake Shore	115 to 113 ½
Louisville and Nashville	54 ¾ to 53 ¾
Manhattan	111 to 112
Missouri Pacific	22 ¼ to 21
Minnesota Iron, asked	60 to
Nat. Lead, common	24 ½ to 23 ¾
N. Y. Central	98 ½ to 98
N. Y., L. E. & Western	11 ½ to 11 ¾
Northern Pacific, pref.	22 to 17 ¾
Northern Pacific, common	7 ¾ to 5
Richmond & West Pt. Term.	¾ to 1 ¾
St. Paul & Omaha	28 ½ to 28 ¼
Union Pacific	18 ½ to 17 ½
Western Union	76 ¾ to 76 ¾

The railroad and miscellaneous bond market has been very quiet, Government bonds closing at 110 @ 111½ for 4s.

Silver has weakened, and 60,000 ounces were purchased on Monday at 73½¢.

New York.

Office of *The Iron Age*, 96-102 Reade street, }
New York, August 16, 1893. }

Pig Iron.—The volume of current business is very light, and the market continues weak. We quote Northern brands \$14 @ \$15 for No. 1; \$13.25 @ \$14.50 for No. 2; \$12.25 @ \$12.50 for Gray Forge, at tidewater. Southern Iron, same delivery, \$13.75 @ \$14.50 for No. 1; \$12.25 @ \$13.25 for No. 2; \$12 @ \$12.25 for No. 3; \$12 @ \$12.25 for No. 2 Soft, and \$12.50 @ \$13 for No. 1 Soft. Gray Forge remains \$11.50 @ 12.50.

Spiegeleisen and Ferromanganese.—There has been no business. Ferromanganese is nominally \$55.50 @ \$56 at tidewater.

Billets and Rods.—The market is very dull. We quote nominally: Domestic Billets, \$23 @ \$24, and foreign Billets, \$28 @ \$28.50, tidewater; domestic Wire Rods, \$30 @ \$31, and foreign Rods, \$39.50 @ \$40.

Steel Rails.—The market is lifeless and no new orders have been placed. Before the close of the present month all the Eastern mills will find themselves at the end of the orders which it is safe to roll. Unless new work comes up in the interval they will all be idle.

Track Material.—We quote: Spikes, 1.70¢ @ 1.90¢; Fish Plates, 1.45¢ @ 1.60¢; Track Bolts, Square Nuts, 2.25¢ @ 2.40¢, and Hexagon Nuts, 2.40¢ @ 2.50¢, delivered.

Manufactured Iron and Steel.—Nothing of consequence is being done, the mills being confined to delivering on old contracts and taking care of small current orders. The Maryland Steel Company have taken the contract for a steam yacht designed by Mallory for Mrs. T. Carnegie. We quote: Beams up to 15-inch, 1.75¢ @ 2¢; 20-inch, 2.10¢ @ 2.25¢, for round lots; Angles, 1.75¢ @ 1.90¢; Universal Mill Plates, 1.70¢ @ 1.90¢; Tees, 2¢ @ 2.15¢; Channels, 1.80¢ @ 2¢, on dock. Steel Plates are 1.65¢ @ 1.90¢ for Tank; 1.90¢ @ 2.10¢ for Shell; 2¢ @ 2.15¢ for Flange, and 2.50¢ @ 2.80¢ for Fire Box, on dock; Refined Bars are 1.60¢ @ 1.9¢, on dock, and Common, 1.45¢ @ 1.60¢; Soft Steel Bars are 1.50¢ @ 1.70¢; Scrap Axles are quotable at 1.75¢ @ 2.10¢, delivered; Steel Axles, 1.70¢ @ 2¢, and Links and Pins, 1.70¢ @ 1.80¢; Steel Hoops, 1.75¢ @ 1.90¢, delivered; Cotton Ties, 75¢ @ 85¢ per bundle, at mill.

Old Material.—We quote nominally: Old Iron Rails at about \$15 @ \$15.50; Old Steel Rails, \$12.50 @ \$13; No. 1 Wrought Scrap Iron at \$15 @ \$15.50, and Car Wheels at \$11.50 @ \$12.

British Iron and Metal Markets.

[Special Cable Dispatch to *The Iron Age*.]

LONDON, WEDNESDAY, August 16, 1893.

Pig Tin prices have declined about £2. 2/6. Trade demand has been good, particularly for futures, but this was offset by the unfavorable advices from America and pressure to sell on the part of Continental operators. There is hardly any outside local speculative interest. Transactions to-day in Straits were at £78. 7/6 @ £78. 10/ for prompts and £78. 7/6 for three months' futures.

Copper has ruled somewhat irregular, at a rather lower level of prices. Some buying interest was aroused by reports that supplies from America will be smaller after receipt of heavy quantity on the way. Unfavorable financial situation, however, acted as a restraint later on. The Anaconda Company, it is reported, have disposed of stock here, and now refuse to accept 8/6 for Argenti-ferous Matte. To-day's quotations on Merchant Bars were £41. 2/6 for prompts, and £41. 10/ for three months'

HARDWARE.

Condition of Trade.

THERE is little in the condition of affairs in the Hardware trade to indicate the approach of the activity which in ordinary times would be expected to begin about this season. Travelers are to a large extent at home, and manufacturers and jobbers are making slight efforts to secure trade. Prices on manufactured goods are generally low and already based on cheap raw materials. Stocks are generally small, or at least moderate, and there is but little inducement to force goods on the market at lower prices, even if this course would result in a large increase of business, while manufacturers are continuing the conservative policy which they have pursued for many months, in reducing production to conform to the conditions of the times.

Chicago.

(By Telegraph.)

Hardware jobbers talk more cheerfully, although they do not claim that business is much better, but there is a slight improvement which makes them feel that the worst is over. Every day also brings the time nearer at hand when preparations must be made for cold weather, and this will certainly add to the volume of business. The news from agricultural districts is encouraging and farmers are expected to be in good condition shortly from the heavy demand for food products. This will at once be reflected from the retail Hardware trade. There is some apprehension that a revival in trade may be so sudden that it will catch dealers generally very short of stock. The Heavy Hardware trade is in better shape than a short time since owing to the improved demand for iron and steel from consumers who usually buy of manufacturers direct. Collections are by no means poor.

St. Louis.

(By Telegraph.)

The same old story of dullness is repeated by jobbers from week to week. Country dealers will not order their usual complement, and jobbers are doing the smallest business they have done for years. Prices are held fairly well, as cutting does not seem to increase business to any appreciable extent. In some lines jobbers have practically no stock whatever, and, as manufacturers are closed down wholly or in part, it is impossible to get goods. This applies only to certain lines, par-

ticularly Wire Nails. Jobbers are watching collections, and as a result they show some improvement.

Baltimore.

CARLIN & FULTON.—Since our last letter we can see a decided improvement in trade over July, but possibly not over the corresponding month of last year.

The mail orders have been much more numerous and we have been pleased to see a number of buyers from the South in our market, making their purchases in person, and from what we hear there will be many who will take advantage of stop-over privileges to visit the Eastern cities, either going to or coming from the World's Fair.

While our immediate vicinity is suffering greatly from the lack of rain, we have been informed that the crops of North and South Carolina have lately had most beneficial rains and that they are now in most excellent condition.

This morning's papers furnish us with the gratifying statements from all the large cities to the south of us that they will be able to furnish with ease all the currency necessary to move the growing cotton crop and that the public need have no fears of the stringency affecting its early shipment. This information comes from the cities of New Orleans, Atlanta, Charleston, Augusta, Memphis and Mobile, and will prove of incalculable benefit to business throughout our whole Southern market.

Considering everything, remittances have been remarkably good and while many have asked for accommodation, yet there have been comparatively few failures experienced.

If Congress will but act wisely and promptly trade will soon be all that can be desired.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—

We have to report a very quiet time in trade here in the last fortnight. Jobbers are now resting on their oars, having taken in sails, and are awaiting the outcome of the present unsatisfactory financial conditions. Trade is confined mainly to staple goods, and the little additional business that necessarily comes to hand. Traveling salesmen have been mainly withdrawn. It is expected, of course, that this condition of things will not last long; but it will certainly do so till there is a change for the better in the financial world. In the meantime, jobbers are putting their houses into order for whatever is liable to occur; so that, whether times improve or not, they will be in shape to meet the possibilities. There is no buying done except for actual necessities. Stocks are being depleted somewhat, and when things clear up, as it is hoped will be done at an early date, there will be considerable amounts of goods ordered, and probably most of them in a hurry. Still, even with the most favorable outcome, business will be conducted on a more conservative basis than here-

tofore, and trade will be largely restricted this fall.

Collections have been reduced somewhat, but no more than has been anticipated. The fact is, they have been unusually good in the Northwest this season, taking into account all the circumstances, and the jobbers feel well satisfied over this important factor in the situation.

Since our last there was a flurry in some of our banks, which has wholly passed away, except that one bank is still closed, pending the decision as to whether it will resume business or go into the hands of a receiver. The high standing of St. Paul as a financial center is certain to be maintained throughout this season of distrust and liquidation.

Omaha.

LEE-CLARKE-ANDREESSEN HARDWARE COMPANY.—So much is being written regarding the financial and business conditions of the country, it is necessary that the situation should shift frequently and rapidly or there is danger of the subject becoming threadbare from constant use.

Trade is in very much the same condition as outlined in our last report, and business men do not appear to have materially changed their views.

The general policy still obtains of keeping close to the shore and waiting for the financial storm to blow over before venturing very far from land. Goods of all kinds are being purchased in very moderate quantities, and the trade partakes largely of the hand-to-mouth character.

Just at present there are symptoms of a better tendency in the financial situation, which, to a limited extent, is reassuring. These indications may not be very distinct, but they are strong enough to give assurance that the general situation is not becoming any worse. The splendid crops of the past and the very favorable outlook for the coming corn crop ought to make business good, and would, without doubt, in ordinary times.

The cutting down of loans by the banks has made it very difficult for some firms that are obliged to borrow to do business, and has compelled some of them to reduce their operations within the bounds of their own capital. Then the uncertainty as to when the money market will return to its normal condition is preventing some few business houses from anticipating the future and making plans for extension of business operations later on.

Although there is every evidence of general prosperity in this State, it is impossible to reduce the credit of business houses without reducing to some extent the volume of business. In spite of all drawbacks, however, the jobbing Hardware trade of Omaha is enjoying a fair share of business for this season of the year.

New Orleans.

A. BALDWIN & Co.—The financial situation is the all-absorbing topic in this section and it has completely demoralized all lines of business. We have not been affected to the extent of our Northern and Western neighbors,

but it has finally reached the Southern section of the country. Business in a general way is fairly active, but all accounts are scrutinized so closely that there are very few goods moving. Most of the jobbers are canceling or holding back shipments of orders placed for early fall delivery, as they do not feel justified in making any heavy additions to their stocks under the present circumstances.

Cleveland.

THE W. BINGHAM COMPANY.—There is little if any change in the condition of trade since our last. Buyers of all classes are still holding off and are ordering from day to day only such goods as they are obliged to. Most of the large jobbing houses are extending their travelers' time of recreation, and but few men are on the road. Prices on the staples of Wire and Nails are somewhat higher and decidedly firmer, owing to a curtailment of supply on account of the mills shutting down, with no indication of their starting up at present. Collections are not encouraging and currency is very scarce. Many of the factories are paying their employees in small checks on local banks, which are taken by dealers on accounts.

Louisville.

W. B. BELKNAP & Co.—It is very difficult to make any interesting reading out of the Trade Report at present. Everything is prosaic, dull, and as inelastic as the price of Finished Iron, for example. There is an unhappy timidity, both on the part of buyer and seller; the first fearing a lower price almost immediately or his own inability to pay at the agreed time; the second apprehends that his customer's pet bank will suspend and he plead as a stay law against all collections.

The sensations of the day are so thoroughly worked by the morning and afternoon papers that the average reader would hardly seek out the Trade Report for anything refreshing; therefore, as little is expected of us we gather courage.

Price on Iron is firm—no bargains are offering yet. Manufactured stock, at least, does not seem to have been hypothecated to any great extent—at any rate there have been no failures worth talking of in the Iron business, so there have been no lots put on the market at assignees' or sacrifice prices. Prices have been so low for several years, and stocks run so close, that there is actually nothing in sight for a squeeze.

The heaviest decline in any commodity is that of New York exchange, which is reported to have sold at anywhere from 2 per cent. to 3 per cent. discount for cash. This beats the terms of the American Axe & Tool Company, for example, all to pieces. They no doubt thought they were doing the liberal thing by offering 8 per cent. per annum for prepayment. It takes a right strong discount nowadays to draw out actual currency, and 1 per cent. a month is of little more effect than a second hand mustard plaster. However, we are getting down on a good cash basis, and those who survive will doubtless be able to look at each other with pride in the satisfaction of having demonstrated their individual and eternal fitness.

The scarcity of money and shrinkage of trade has caused all good business concerns to study economies not previously thought of, and the lesson,

though sharp and severe, is bound to be a good one.

But surely it is a ridiculous situation for this great country to be in, all on account of asinine legislation, which has proven to be ineffective and destructive from the beginning. If we could only have a law requiring all would-be legislators to pass an examination in the rudiments of political economy before being permitted to serve we might have some views better worth the printing than those of Populist Senators from the West, whose principles, boiled down, would seem to be that the cheaper the metal the better it is adapted for the poor man's money. Put us on a footing with the best nations of the earth by giving us the best money, and our cotton and our wheat and our wool, and all of our other products, will bring what they are worth. We would not be subjected to the heavy discount of the exchange broker.

Portland, Ore.

CORBETT, FAILING & ROBERTSON.—Excepting to note events in banking circles there is little material for a letter just now. The suspension of three national banks and two savings banks—the result of “withdrawal of deposits and inability to realize on security”—naturally created a feeling of distrust, and runs on the other banks followed, as a matter of course. The runs lasted but a few hours, and business now goes on as usual. An immense amount of gold has been paid out over the bank counters, and it is now a matter of wonder who has it and where it is kept. With a return of confidence it will some day find its way back to the banks and help to make things easy once more.

Trade continues moderate. The hand-to-mouth policy of country dealers still prevails, and the city trade are careful and discriminating in granting credits.

The prospect of an abundant harvest is being realized, and the hop yield is in excess of any previous year.

San Francisco.

HUNTINGTON HOPKINS COMPANY.—In times like these there is very little occurring from a business point of view that will interest the general reader. There is no denying the fact that business is poor and collections about the same. Business houses, as a rule, are not pushing the sale of goods, and some country merchants are not buying what they actually need, the majority of them carrying about all they can bear on their books. We are, of course, like the rest of the country, looking forward to better times, when confidence will be generally restored.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—During the last two weeks trade has been confined to narrow channels. In locations that are suffering from the effect of factories' reduced working hours, or where factories are entirely closed, trade is naturally restricted in volume.

In other locations, depending upon agricultural or farm products, there is not far from the usual demand for goods, restricted only to a limited extent, owing to the hoarding of money by their customers.

The local crop products are good, and building is only being restricted to the extent of the scarcity of currency. Through the South the outlook, under any other circumstances

than those which now confront us, would be more than hopeful. Mail orders are numerous, but for smaller quantities than usual.

The most unfortunate feature of the situation is collections. It is quite evident that many customers have fallen into the mistaken idea of holding their reserve either in bank or in their safe.

We beg to differ from the advice given by the Controller of Currency, Mr. Eccles, who advises persons to keep their money in bank. Our advice is that persons had better keep the money in circulation. One would scarcely realize how many times a \$100 bill (or any other given amount) can be turned in the liquidation of debts. It passes from hand to hand and from bank to bank in liquidation of accounts.

Keep it in circulation is the proper plan; besides, but little harm can come to the merchant if he owes nothing. No matter how badly your bank may desire funds, self-preservation demands liquidating one's debts.

Neither can one sit idly looking on, waiting for something better to turn up. Keep active; be prepared for all the opportunities of trade that present themselves; pay your bills and buy again; but above all, keep your credit good. Not only let there be no uneasiness on the part of your creditors, but remember the fact that they have bills to pay, and their ability to pay them depends upon their customers.

Interior customers should realize that prices of product are low, fearfully low; but the prices they pay for their goods are almost correspondingly low, and in this they have had advantage prior to the reduction in price of agricultural products. There is an abundance of everything that brings in money.

Discredit the pessimist who is happy when predicting ruin, and let each one put his shoulder to the wheel. Whilst cautious, be just unto others as well as yourself. The night may be temporarily dark, but daylight is likely to soon appear. The lack of confidence resulted in the hoarding of money.

There is, however, a vigorous increase of the currency being prepared for circulation, and \$15,000,000 is already in active preparation by the national banks, who have deposited their bonds, and not less than \$40,000 output is likely to enter into circulation in the near future.

This increase will not be profitable to the national banks, owing to the fact of their not being able to issue an equal amount of currency to the bonds deposited; nevertheless, at this disadvantage they are willing to do it to relieve themselves as well as the money stringency.

Since our last favor rays of hope and encouragement have been seen in the distance, owing to the process of the transfer of a large amount of gold from London to this country—some \$13,000,000—to be followed with another shipment of \$5,000,000 to \$10,000,000.

The enthusiastic partisan, who saw no danger when, in one week, from \$5,000,000 to \$6,000,000 were leaving our shores for excessive importations during the spring (never to be returned for the same purpose), refers to this gold importation more enthusiastically than is necessary.

What do we sacrifice to get this return of gold which will enter our ports at an early date? It is partly borrowed on hypothecated securities sent out by brokers to realize on temporarily; partly upon stocks recently sold to London at the present unprecedented low rates, which will doubtless be returned upon us again for gold as soon as sufficient profit is shown to satisfy the purchaser to make the sale; but lastly, though not least, wheat,

largely held by the Western capitalists as security, who determined to realize on the same at any price that England could be induced to buy at, was unloaded in that market at a figure scarcely ever before known, and thus the price of wheat has been established for our whole country; and the farmer, instead of the anticipated rosy outlook for the year, especially in the interior and remote regions, must be satisfied to receive from 45 to 50 cents per bushel.

Simultaneously with the head lines seen in our daily papers of the amount of gold coming to this country, were published reports in foreign papers, and a leading London paper, under date of July 31, stated that the Bank of England must resist the further shipment of gold in the usual manner, by raising the rate of discount to whatever point would stop it. The consequence is the rate of discount in the Bank of England was advanced immediately $\frac{1}{2}$ per cent., followed a few days later by a further advance of 1 per cent., and, if necessary to prevent a large outflow, an additional 1 per cent. will no doubt be demanded.

They propose to work on the principle that "a bird in the hand is worth two in the bush." They have secured the money from us, and to let it slip through their hands again, it will only be done at a greater sacrifice of wheat and breadstuff, or a further sacrifice in the price of our stocks.

Therefore, if any further reasons are required to show the great and serious blunder made in our original reduction of our gold surplus than given in the article in *The Iron Age*, under date of August 3, you have it above.

We are, by the theoretical reduction of our surplus, financially at the mercy of our foreign neighbors, as far as gold is concerned.

Our experimental financial policy has had a far greater depressing effect on our monetary troubles than is generally realized. Unquestionably the Secretary of the Treasury had authority, under the act of July, 1890, to redeem the silver notes (or certificates) issued as legal tender for bullion, purchased in either gold or silver. These notes are legal tender at the face value in payment of all debts, public or private, and are redeemable either in gold or silver coin, at the option of the Secretary of the Treasury.

When this law went into effect, however, silver was quoted at \$1.25 per ounce. Therefore it was not wise to suggest the possible expediency of paying these, contrary to all precedent, in silver, especially at the present time, when silver is worth 70 cents per ounce, making the silver dollar worth only about 52 cents.

When our Government entered into the silver trade they naturally took the risk of all traders, and, as results have shown, they have sustained losses that all traders are liable to. They possibly would have sustained less losses had they entered into the Pig Iron trade; but they have sustained no greater losses during the last three years than the wholesale Hardware trade, as well as manufacturers, have sustained during the last few years of liquidation.

Further, when our Government entered into the market as a broker, it naturally took a broker's risk. The Secretary of the Treasury recently entered into the market as a silver broker, and did not buy the required amount of 4,500,000 ounces of silver per month, as prescribed by law, but only such a quantity as, in his opinion, was the present value, and only such amount as was offered below 70 cents, the price based upon a sale made in England, refusing what was offered at 70 cents, but later paid 72 cents, and a recent price paid was 75 cents per ounce.

Our present troubles may therefore be classified under the following heads:

First and greatest, the mistaken theory of gold surplus reduction.

Second, partisan insincerity.

Third, Government's experimental financial policy.

Fourth, the silver law, existing prior to July, 1890, supplemented by the Sherman silver purchasing clause, July 14, 1890.

President Cleveland, in his message sent to Congress, surpassed the anticipation of his most sanguine friends, and those who had prepared themselves with dictionary conveniently located, expecting his customary use of coined or unused words, found instead, in plain and unadulterated language, the best written document that ever came from his pen. It is wise, plain, forcible and patriotic, and in it he did himself great justice.

He presents the situation in a manner that cannot be misunderstood, and plainly refers to the present perilous situation and strongly urges that all political and party prejudices be set aside, in order to speedily accomplish what is essential, in order that the country may be again restored to a prosperous condition.

It now remains with the Congress to act upon his suggestions without delay. The country is in no condition to be made to suffer still further from unnecessary delay.

President Cleveland states plainly: "The matter arises above the plane of party politics. It virtually concerns every business and calling and interests every household in the land. 'He gives twice who gives quickly.'"

Now, will Congress do it? As before stated, President Cleveland has enemies (in assumed friends in the fold), which are greatly to be feared.

Referring to the situation, a leading administration paper in New York summarizes the situation thus: "In the Senate we can depend upon one-half of the Democrats and two-thirds of the Republicans;" all of which goes to prove the financial problem should be eliminated from party politics.

Notes on Prices.

Cut Nails.—The demand continues small, transactions are few and the quotation of \$1.05 for carload lots at mill remains unchanged, but this figure is more firmly maintained than it has been, this market feeling the influence of the improvement in Wire Nails. Small lots from store in New York are held at \$1.30.

Chicago, by Telegraph.—An improvement is noted in the demand for Cut Steel Nails. Good specifications have been received by manufacturers within the past week. It is too early yet to found much hope on the movement, which may or may not be the forerunner of a better condition of things. Prices are unchanged at \$1.20 to \$1.25, Chicago, for factory lots, and \$1.25 to \$1.30 for small lots from stock.

Wire Nails.—The makers of Wire Nails appear to have succeeded in establishing an understanding among themselves, and the quotation has been advanced to \$1.50 for carload lots at mill by all the makers. The mills remain generally closed and stocks there are very much reduced and assortments broken.

Chicago, by Telegraph.—Buyers seem to have suddenly found that they need Wire Nails; even those who did not expect to be in the market for several weeks. Inquiries are numerous and sales have been made at advanced figures. The price for factory lots is now \$1.50, Chicago, and makers say that there will soon be another rise. Factories are still shut down and stocks are badly broken. Some manufacturers have not made deliveries for two weeks on old contracts, although importuned by their customers, alleging that they have no stock to ship from. Jobbers' prices are maintained at \$1.55 to \$1.60, according to quantity.

Barb Wire.—Business in this line continues confined to small lots, and we continue \$2.45 to \$2.50 as the nominal quotation for carload lots of Four-Point Galvanized at mill, small lots from store being held at the usual advance.

Chicago, by Telegraph.—The Ellwood Mfg. Company have issued a circular quoting Glidden Wire at \$2.10, Junior Wire \$2.05, Ellwood Four-Point \$2.05, for carload lots of Painted, with 5 cents advance for less than carloads, and 40 cents advance for Galvanized, at their factory at DeKalb. Terms are 60 days, or 2 per cent. off for cash in ten days. These prices only hold good for stock on hand. The company further state that they will hereafter refuse to give long credits, usually known as spring terms. This is an important announcement, and introduces a reform in the Barb-Wire trade which will be appreciated by other manufacturers. The practice is to be stopped of dating bills ahead and carrying accounts for an indefinite time on the payment of interest. Manufacturers report a decided quickening in the demand, although sales thus far have been mainly in small quantities. Transactions are exclusively for cash. Carload lots of Standard Barb Wire are quoted \$2.10 and \$2.50 respectively for Painted and Galvanized. Small lots from stock are held at \$2.20 and \$2.60.

Meat Tenderer.—The Frasse Company, 19 Warren street, New York, as agents for the Lavigne & Scott Mfg. Company, New Haven, Conn., are offering the Lavigne Peerless Meat Tenderer, as illustrated in this issue. This article is sold to the trade at a discount of 20 per cent. from the following list:

Japanned and bright.....	Each. \$1.00
Full nickeled.....	1.25

Detachable Blade Razor.—The Evertz Detachable-Blade Razor, illustrated in this issue, is offered by Broch & Co., 47 Warren street, New York, as sole agent for the United States. The Razors, with three blades each, are sold to the trade at \$15 per dozen, net.

Corn Razor.—This article, which is offered by Alexis Witte, 47 Warren

street, New York, and illustrated in this issue, is sold to the trade at \$6 per dozen, net.

Spery Combination Grater and Slicer.—This article was recently described in our columns. It is put on the market by the Chicago Hardware Specialty Company, 147 and 149 Lake street, Chicago, and is sold to the trade at \$2.50 per dozen and \$22.50 per gross.

Preserve-Jar Holder.—This article, which is illustrated in this issue and is being introduced by Francis H. Loss, Jr., 33 Murray street, New York, is sold to the trade at \$3 per dozen list, subject to a discount of 10 per cent.

Smith's Brace.—A description of this Brace appeared in our columns a few weeks since. The Brace is put on the market by the Holt Mfg. Company, Hartford, Conn., who are selling it to the trade from the following list, which is subject to a discount of 50 and 10 per cent.:

<i>Smith's Brace.</i>		Per dozen.
No. 6, 6-inch sweep.....		\$21.00
No. 8, 8 ".....		24.00
No. 10, 10 ".....		27.00
No. 12, 12 ".....		30.00
No. 14, 14 ".....		33.00

<i>Smith's Brace, with Ratchet.</i>		Per dozen.
No. 6, 6-inch sweep.....		\$30.00
No. 8, 8 ".....		33.00
No. 10, 10 ".....		36.00
No. 12, 12 ".....		39.00
No. 14, 14 ".....		42.00

Cordage.—Affairs in the Cordage world, which were very mixed up to last week, are now assuming a more tangible form. The National Cordage Company have a manufacturing capacity equal to about 60 per cent. of the entire output. The balance is controlled by independent operators. The receivers of the National Company recently made an agreement with John Good to restore prices to a basis that would give a difference of 4 cents per pound between the finished product and the raw material. At the time it was suggested that a meeting of the independent manufacturers be called for the purpose of ratifying this price. The meeting was held on Wednesday and Thursday of last week, but the National Cordage Company were not represented.

It was decided to form a Protective Association for the purpose of deriving a greater net revenue from the business. In the absence of a representative from the National Cordage Company, it was considered a little premature to take any action on prices. The lines were laid for a working agreement which will maintain prices and facilitate the purchase of raw material.

A decision reached at the meeting—namely, to replace machinery now in use by that manufactured by John Good—was a most important step in its bearings on the future of the industry. It was demonstrated that the new spindles will manufacture Cordage 1

cent per pound cheaper than the old. This is partially due to the fact that one new spindle will do the work of two old ones. The number of spindles to be replaced under the agreement is 2000.

The National Cordage Company have in use spindles similar to those which are to be replaced by the independent mills.

From this it will be seen that the minority interest, which is perfectly solvent, has taken steps which will give it 1 cent per pound advantage over the majority interest, which is as yet insolvent. It is current opinion that the leverage which is thus secured by independent manufacturers will be used to force the National Cordage Company into some sort of a relation which will be beneficial to all makers.

Heretofore the two factions have not been in a position to negotiate. The independents, headed by Mr. Good, lacked organization, while the National Company, now in the control of bankers, was not in condition financially to talk business. One of the objections has been overcome, and it is believed that the National Company will work their affairs into shape under the reorganization plan during the fall. They must recognize a formidable competitor in the Protective Association, and being possessed of intelligent management, the supposition is that it will readily agree upon an equitable basis of prices.

Glass.—The situation of the Window-Glass market is about the same as reported last week. Eastern prices of domestic and imported Glass conflict in some cases, resulting in lower figures being named than the National official prices. Glass for immediate consumption is selling in small quantities, and it is understood that stocks in dealers' hands are generally low. Nothing definite was done regarding wages at the meeting of the National Window Glass Company, held at Chicago last week, further than to instruct the Wage Committee to arrange for a lower scale than that of the last fire. Various manufacturers and jobbers name October 1 to December 1 as the probable dates between which factories will start up. There is nothing new in the Plate-Glass market, and quotations on all kinds of Glass remain unchanged.

CLINTON WIRE CLOTH COMPANY, Clinton, Mass., announce that William H. Howard has assumed charge of their New York store, having been succeeded in Chicago by Edwin F. Schmidt, for many years in the company's employ at factory and Chicago. The company also take occasion to thank their customers for their kind consideration since the destructive fire at their factory April 19 last, and state that in rebuilding they have largely increased the capacity of their plant and fitted it with the latest and most approved machinery, which will enable them to meet all demands and maintain the high quality of their goods.

Meetings of the Rope Manufacturers.

THE MEETINGS of the Rope manufacturers held August 9 and 10 at the offices of the John Good Cordage & Machine Company, New York, resulted in perfecting a temporary organization of the Cordage interests represented, of which John Good was elected president. A committee of five was appointed to formulate plans for forming a permanent association, preparing articles of incorporation, by-laws, &c. The stated object of the organization when perfected will be a more harmonious action both in the purchase of the raw material and in obtaining fairly remunerative prices for the manufactured product. The proposed plans include the depositing of a forfeiture by each member of the association, and the general supervision of the workings of the association by a committee. The following were represented at the meeting:

PENN CORDAGE COMPANY.
BRIDGEWATER CORDAGE COMPANY.
JOHN GOOD CORDAGE & MACHINE COMPANY.
TRAVERS BROS. & CO.
HOOVEN, ALLISON & CO.
BAY STATE CORDAGE COMPANY.
PEORIA CORDAGE COMPANY.
COLUMBIAN CORDAGE COMPANY.
MIAMISBURG BINDING TWINE & CORDAGE COMPANY.
NORTHWESTERN CORDAGE COMPANY.
JAMES CATING.
LEWIS A. MILLER.

A cordial invitation to attend the next meeting will be extended to those interests which were not represented at the meetings of August 9 and 10. The progress made at these meetings looking to the formation of a permanent organization, and the harmony of sentiment and unity of action exhibited by all present, were subjects of resolutions passed by the meeting. The meeting adjourned subject to the call of the president. Among the prominent Cordage interests not represented at the meetings were the National Cordage Company, Plymouth Cordage Company, Pearson Cordage Company, and Edward H. Fitler & Co.

Hardware Organizations and the Sherman Bill.

AT A REGULAR MEETING of the Boston Iron and Hardware Club, held on August 8, the following resolutions were unanimously adopted:

Whereas, The remedy for the present depression in business and finance rests wholly with Congress, now in session, and believing that repealing the purchasing clause in the Sherman Silver bill will tend to establish confidence—

Resolved, That the purchasing clause of the Sherman Silver bill should be repealed, and that no legislation should be enacted as a substitute at the present session of Congress.

Resolved, That an expert commission should be appointed to submit to Congress, at its regular session in December, a comprehensive plan for the readjustment of our currency, based on a gold standard.

Resolved, That the special session of Congress should adjourn after repealing the purchasing clause and appointing a commission for the readjustment of the currency.

American Machinery in Great Britain.

CHARLES CHURCHILL of Charles Churchill & Co., Limited, 21 Cross street, Finsbury, E. C., London, is now in New York. Mr. Churchill is a native of this country who went to London 30 years ago, and three years later established the business of introducing American Machinery and Tools for working metals and wood. The company now have showrooms and warehouses in both London and Birmingham, and carry a stock of leading goods at the latter place of about \$60,000, which enables them to quickly supply many of the factory towns around Birmingham, among which are Coventry, Wolverhampton, Walsall, West Bromwich, &c., many of them being in close telephonic communication. Of course the more important articles are brought over on importation orders. A feature which brings the concern much trade is the rapidity with which rush orders are handled, illustrated by the following incident: A customer having need of two screw machines and not willing to wait two months for them to be made at home, gave an order to this house on a Friday morning.

The indent was at once cabled to the Garvin Machine Company in New York, with these results: The goods were packed and put aboard the Liverpool steamer sailing the next day, and so cabled, and delivery was accomplished inside of 13 days from placing of order, at Wellingborough, Northamptonshire. The principal goods dealt in are illustrated and described in a catalogue which now numbers 318 pages, 11 x 8½ inches, which includes the productions of many of our best makers, whose names are plainly given with the different articles. This enterprise has always been confined to marketing American goods of this character, largely for English and Scotch consumption, but considerable trade is also done with Continental countries through agents in the leading centers. There is no attempt at competition with low-grade English tools. Asked about the present condition of things there, Mr. Churchill said, while engineers and others were complaining of dullness, their business had been but little affected yet, and attributed it to the fact that where new machinery was being put in it was of the latest and best, and much of American production was sought, as better goods for the money were secured than were obtainable at home. He believes there is going to be a steady and increasing demand in Great Britain for high-grade machinery and tools made here, and gives as a reason that those introduced in years past have made a good impression. Mr. Churchill will go to Chicago about August 20, and later to St. Louis, Cincinnati, Philadelphia, and back to New York. After that he will visit Hartford, Providence, New Bedford, Boston, Worcester, &c., and return to England about October 4. His address in New York is at 90 Maiden Lane.

THE GOODELL COMPANY of Antrim, N. H., manufacturers of Cutlery, have notified their employees that, owing to the scarcity of orders, the works will be run but three days a week until further notice.

Trade Items.

IT IS REPORTED that the directors of the United States Whip Company voted, on August 10, to shut down all the factories in the Whip Syndicate until August 28. The shut down is occasioned by the inability of the companies to dispose of their goods.

ALBRECHT GRAEF of the Graef Cutlery Company, 98 Duane street, New York, who went to Europe in June last on business connected with his house, is expected back in September.

THE KILMER MFG. COMPANY, Newburg, N. Y., report an unusual demand for Bale Ties, which is due in a large measure to the heavy exportation of hay just at this season. The company make an extra heavy Tie for export use, and their extensive works are running full time in order to keep up with orders for these goods as well as for Barb Wire, Stel Wire Rods, and other lines.

THE TRADE will observe the advertisement of Atlas Mfg. Company, New Haven, Conn., on another page, in which they illustrate their improved Bradley Steel Shelf Bracket. The improvement in this Bracket was introduced in February last and pertains to the screw holes in the upright arm. This construction, the company claim, adds to the side bearing, looks better than the former pattern, while it also admits of driving the screws more readily. As an illustration of the sustaining power of this Bracket the company advise us that in a recent test they suspended 925 pounds from a pair of 5 x 7 Brackets before they broke down.

L. BISSELL, SON & Co., 12 Murray street and 15 Park Place, New York, among the Special Notices in this issue, announce an attractive trade sale of Cutlery to take place on August 23, 24 and 25. A very large and varied line of Table and Pocket Cutlery, Carvers, Butcher Knives, Silver-Plated Ware, Scissors, Shears, &c., will thus be disposed of.

S. A. HAINES of the S. A. Haines Company, Indianapolis, Ind., announces that after September 1 his interest in Bicycles will be entirely with the Eclipse Bicycle Company of that city, with factory at Beaver Falls, Pa. The Eclipse Bicycle Company will not only make Mr. Haines' Wheels but an increased line of their own. Mr. Haines has been made manager of the sales department of the company. Their price-list will be ready by October 1.

KELLY AXE MFG. COMPANY, Louisville, Ky., advise us that after their annual shut down of ten days for repairs and much needed rest, they have started their factory full handed, with a night turn in one department. The company state that they have more orders on their books at the present time than for any corresponding period in the past. The bulk of these orders is referred to as for the best grade of Axes.

CORDLEY & HAYES, 173 Duane street, New York, sole agents for the United Indurated Fiber Company of New Jersey, whose factory at Lockport, N. Y., was destroyed by fire on July 29, desire us to state that while this fire will seriously cripple them in filling orders for Pails, Tubs, Spittoons, Wash Basins, Butter Bowls and Slop Jar Mats, they are still in position to supply all orders for many of their lines, having the product of their other factories to fall back on. They are rebuilding their Lockport factory on a much larger scale than formerly, and are confident that in three months they will be again turning out goods from that point.

THE ELMIRA STAMPING & PAPER MFG. COMPANY, Elmira, N. Y., make a specialty of Jute, Rag, Rope and Manila Papers, which they sell direct to the manufacturers of Tinware, Wire Goods, Hardware, Enameled Ware, &c. The company refer to the quality of these papers. They are also putting on the market the Ithaca Red Rosin-Sized Sheathing Paper. The company's paper mills are located at Ithaca, N. Y.

THE OHIO LANTERN COMPANY, Tiffin, Ohio, who manufacture the Surprise tubular lanterns, have made W. W. Pryor & Co., 81 Chambers street, New York, general Eastern agents for the territory embraced in the New England States, New York, New Jersey and Pennsylvania. A full line of samples will be carried in New York and the trade will be supplied with goods at factory prices.

CAVANAGH & THOMPSON, jobbers of Wooden Ware, Brushes and House-Furnishing Goods, 130 Reade street and 13 Hudson street, New York, who were burned out recently, have decided to go ahead at the same stand, and hope to be in condition to execute orders by September 1. Their loss on stock amounted to about \$4000, fully insured. They have settled with the underwriters and have about closed out such stock as the fire left. A force of carpenters will be put in as soon as practicable, the interior renewed and a stock of merchandise installed, with which to resume business.

UNDER DATE OF AUGUST 1, Salem Wire Nail Company, Salem, Ohio, announce that they have opened a branch office in the Pickering Building, Cincinnati, with W. H. Foster in charge. Mr. Foster has been with the company at their New York office for several years and is thoroughly posted on Wire Nails. He will visit the trade in the cities and towns along the Ohio River, all parts south of the Ohio River, east of the Mississippi and Louisiana.

Price-Lists, Circulars, &c.

SIMMONS HARDWARE COMPANY, St. Louis, Mo.: Catalogue No. 221, Lamps and Lamp Goods. This catalogue for 1893-94 is the same in form as those previously issued relating to this line of goods. The 200 pages are fully illustrated, showing Lamps in large variety, also Lamp Goods, Lanterns, &c.

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn.: 1893 catalogue of Gun and Sporting Goods. This is a large-sized book, containing 104 pages, with an index of contents on the inside of the front cover. Illustrations, descriptions and prices are given of Guns and Sporting Goods in a large variety of styles. On the inside of the back cover attention is called to the company's plan of making the selling of Locks and fine Builders' Hardware easy for retailers. Sample boards of light antique oak, mounted with these goods, are provided by the company, they charging for the samples only, but nothing for the board or for mounting. This enables a dealer to show a large and complete line at a very small expense. An illustration of a board is given, showing mounted samples of one of the four lines of these goods included in their stock.

HOLROYD & Co., Waterford, N. Y.: Stocks and Dies and Threading Tools. Attention is directed to these goods on one side of a very neat and tasteful little pocket barometer, which is 1½ inches in diameter. In the center of the reverse side are five small colored

disks, which are designed, by changes in color, to indicate the approach of clear, changeable and stormy weather. The points of the compass are marked on this side; also statements regarding the kind of weather following easterly and westerly winds, and that resulting from a red sky at sunset. The company advise us that they will be pleased to send one of these weather indicators to every reader of *The Iron Age*, upon the receipt of name.

World's Fair Exhibits.

THE AMERICAN SCREW COMPANY of Providence, R. I., have three exhibits—one in Machinery Hall annex, section 29, K-50; the second in Manufactures Building, section 3, block P, No. 2; and the third in the Government Building. The exhibit in Machinery Hall illustrates the new cold-forging process employed in the manufacture of Wood Screws, Drive Screws, Tire Bolts, Stove Bolts, and any other kind of circular Screw. Two machines are shown in operation—the three-blow header and the threader, these being the only machines needed in this process. The wire used by the company is drawn with unusual accuracy, to the thousandth of an inch even for large-sized Screws. The cold-forged Screw wastes no metal except a very small quantity which is cut off the point of the Screw blank. Wire is used three sizes smaller than the gauge of the finished Screw. The three-blow header tapers the shanks, forms the head, forges the slot in the head, points the blank and cuts it off. The blanks are then taken to the threader. Here they are poured in a hopper, in which an ingenious arrangement gradually places them in a row, heads up, in an inclined runway leading between two dies which shape the threads. These dies move horizontally, in reverse action to each other, and form the Screw, pushing the metal together and thus raising the thread higher than the shank. One forward motion of the head completes the Screw and it returns idle. The Screw is not cut at any stage, and is much stronger than the ordinary cut Screw, while by this process many more of them are turned out per minute than by the old machines. In a Showcase are exhibited four large Screws, showing the form of the product at different stages of the development of the Screw industry during the last 50 years, the cold-forged Screw easily carrying off the honors in the comparison by reason of its fine and very symmetrical appearance.

The exhibit in the Government Building is shown in cases in the north-western corner of the building, Department of the Interior, Patent Office Section. It consists of 19 models of Screw machinery, from the oldest to the newest designs, covering cutting, heading, slotting, threading and cold forging. These models were loaned to the Government by the American Screw Company. They constitute a very striking demonstration of the evolution of the modern process of manufacturing wood and other circular Screws. The history of the machines of which these models are shown is very interesting. The first inventor of prominence in the production of automatic Screw machinery was Gen. Thomas W. Harvey, who devised a machine for shaving the heads of Screw blanks. General Harvey was followed by Cullen Whipple, Thomas J. Sloan, Charles D. Rogers and others, and examples of their inventions may be found in the exhibit referred to, also the machinery invented by the last-named for cold forging. The Screw machinery used in Europe has been mainly of the Harvey and Sloan cutting type, cold-forging machinery not being extensively employed there. The

American Screw Company were formed by the union of the Eagle Screw Company and the New England Screw Company, both of Providence, R. I., in 1860, the Eagle Company having commenced operations in 1838, under the management of the late William G. Angell. At the present time in the United States there are 15 concerns manufacturing Wood Screws, and since the year 1810 nearly 100 different firms have undertaken the business.

The exhibit in the Manufactures Building consists of two large upright cases, magnificent specimens of fine cabinet work, one of which contains a specimen of every kind of Screw made by the company's cutting process, and the other contains specimens of the cold-forged product. The first case was used at the Centennial Exposition, while the second was built specially for the Chicago Exposition. The Screws are fastened on a background of black velvet, in pleasing designs. These are very artistic, showing exquisite taste and remarkable ingenuity by those who had this part of the work in charge. Among the cold-forged Screws specially worthy of mention are the company's new Fluted Tire Bolt and their Drive Screws. This Tire Bolt has flutings on the shank which hold it in place in the wood, and thus prevent it from slipping or working round, and thus gradually becoming loose. The flutings being straight, the Bolt is easily driven out. The head of the Bolt is materially strengthened by having the fluting terminate some distance from the head, leaving a plain shank directly under it. The Drive Screw has a thread with wide spirals, so that it can be easily driven all the way. The slot in the head does not extend entirely across, but has a shoulder on each side, so that it is not weakened by the hammer, while the slot is left perfect for the use of a Screw driver in withdrawing the Screw. Samples of these are distributed by the company, including cold-forged Screws distorted to show the quality of the metal. Facilities are further provided to show by practical demonstration how the Drive Screws and Fluted Tire Bolts operate in wood.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

Apart from a sharp reduction in the price of Linseed Oil, which materially reduces the cost of various lines of Paints in Oil, there is no new feature. This reduction, however, in connection with the low rates ruling for Pig Lead and several minor lines of base material, to say nothing of the stringency in the money market, is not without effect upon buyers, who keep a watchful eye upon passing events. For that matter, the conditions specified, along with minor ones of adverse character, give the market anything but a bright appearance. Few changes in prices have occurred, but it would be a very difficult matter to point out where undercurrent of weakness does not exist.

White Lead—Business has been almost wholly of a retail character. Jobbers are not ordering supplies for future delivery, and smaller buyers have taken less stock than usual at this season of the year. Corroders have reduced their output, owing to the unfavorable aspect of affairs, and manufacturers of the cheaper class of Leads, according to all accounts, have found it convenient to do something of the same sort. Hence, while general

quotations remain about the same as they have been for some time past, special rates, allowances, rebates, &c., are the rule rather than the exception, showing a weak market.

Red Lead and Litharge.—From large consumers very few orders have been received and the jobbing movement, to all account, was hardly up to the average for the season. Importers are still pushing foreign Lead in a somewhat aggressive manner at prices about $\frac{1}{4}\phi$ @ $\frac{1}{2}\phi$ under the list rates of the leading producers. It is intimated that this competition is being met sub-rosa and that the official list on Litharge is also purely nominal. In any event the market has a soft as well as dull appearance.

Litharge.—There is quite sharp competition between importers of German and French brands, and the German product, being the cheaper by $2\frac{1}{2}\phi$ @ 3ϕ per lb , is most freely purchased. While this competition goes on the domestic product is virtually neglected. Prices cannot be quoted with any accuracy at the moment.

Zincs.—There seems to be a little friction between manufacturers of American Oxide, the result of accumulation of stock and light run of orders. Certain it is that orders have been coming in slowly at the lower prices noted last week, and that bids have been solicited of still lower figures. On common quality 4ϕ has been shaded for lots of 100 barrels or over. Foreign brands have been dull and prices are weak, although the old list is still quoted.

Colors, &c.—Dry Colors have had very slow sale. Grinders are placing less than their customary orders and from other sources the demand is very slow. Oil Colors and Mixed Paints are offered at irregular prices, owing to the break in Oil, and the market at present is unsettled.

Oils and Turpentine.

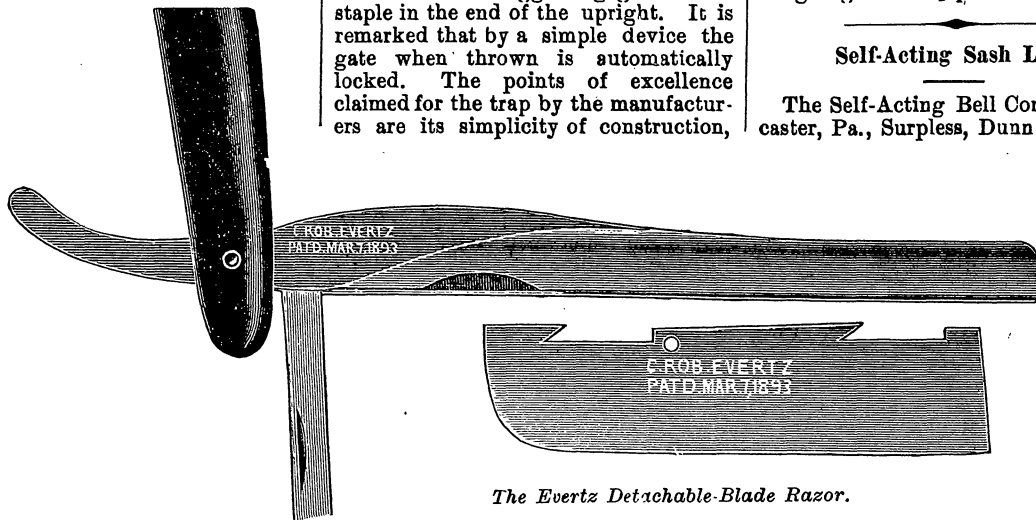
In the market for Oils the leading features have been a sharp decline in Linseed and a turn for the better in prices of Lard product. Neither change was, however, brought about by relation of supply and demand. The Linseed Oil break was due chiefly to aggressiveness between conflicting interests. The improvement in Lard Oil was merely sympathetic with the market for raw material. Other Oils were not affected in the slightest degree, the demand generally having been very tame, while purchases were extremely conservative in the absence of incentive to broad line of action on the part of buyers.

Linseed Oil.—Prices have been dropped to 48ϕ for raw Oil made from domestic seed and 43ϕ for boiled Oil, ditto, but the list price for raw Oil made from Calcutta seed remains at 62ϕ . The break has stimulated purchases on the part of large jobbers and consumers, who have been holding off since the downward movement in prices of raw material began, but otherwise has continued on strictly conservative lines. The market at present is in uncertain shape and laboring under the weight of antagonism that is characteristic of failure to carry out "combine" or "trust" intentions.

Cotton Seed Oils.—Dealings have been on a very moderate scale. The demand continues sluggish in all that the term implies. The offering is somewhat reserved, yet broad enough to afford evidence that the amount of Oil remaining back is not small, and that nicely timed manipulation alone has prevented a sharp decline; not only that, but forced quotations a little higher, say to the basis of 42ϕ for prime Summer Yellow.

The Evertz Detachable-Blade Razor.

The accompanying illustration is of a razor with detachable blades, offered by

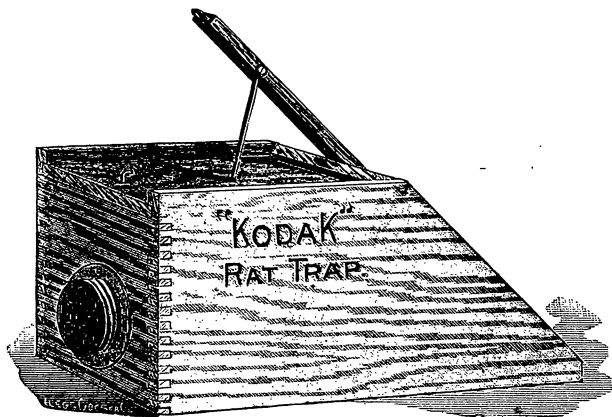


The Evertz Detachable-Blade Razor.

Broch & Co., 47 Warren street, New York, as sole agents for the United States. The blade is provided with notches which engage with rivets in the malleable iron frame, and is held in place by a blade-like piece actuated by a spring back, which, when closed, holds the blade firmly in the frame. Three blades are provided with each handle, packed in one case, and are honed sharp and set ready for use. The blades, it is stated, are made of Ward low's razor steel, carefully and evenly tempered. The razor frame is nicked to prevent rusting, and the handle is of hard rubber. Having three blades to each handle makes it a triple razor, as the blades can be honed and stropped like any razor, and when one blade is worn out it can be replaced by another one. Extra blades with either square or round points can be obtained at any time.

The Kodak Rat Trap.

The accompanying cut illustrates a rat trap put on the market by Waddel Wooden Ware Works, Greenfield, Ohio.



The Kodak Rat Trap.

The trap is described as being made of sugar tree wood, without any springs, about 10 inches long, 5 inches high, weighing 1½ pounds. The perforated screw cap is designed to serve several purposes. It may be removed to bait

the trap; it gives the rat an opportunity of smelling the bait through the cap; the rat being lured into the trap attempts to get out where daylight is seen through the perforations. To set the trap the upright attached to the gate is pressed down and the trigger engaged with a staple in the end of the upright. It is remarked that by a simple device the gate when thrown is automatically locked. The points of excellence claimed for the trap by the manufacturers are its simplicity of construction,

ease in setting, lightness on the trigger, light weight and compact size.

Hammerless Single Gun.

The H. & D. Folsom Arms Company, 15 Murray street, New York, are offering



Hammerless Single Gun.

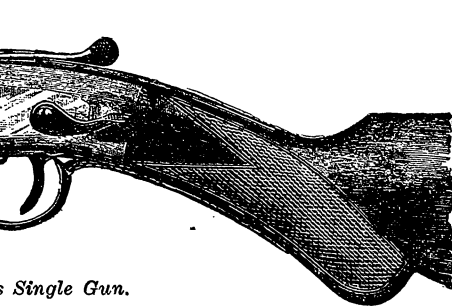
hammerless single guns, manufactured by the Crescent Fire Arms Company, as herewith shown. The gun is provided with the Scott top lever, checkered pistol grip, checkered fore end, fancy butt-plate, and is choke bored. The gun is made in two styles, known as the Club and the Trap. The Club

substitute for the hammer on the side of the gun instead of in the line of vision. The guns are made in two gauges—12 gauge, with 30 or 32 inch barrels, weighing about 7 pounds; and 16 gauge, with 28 or 30 inch barrels, weighing about 6½ pounds.

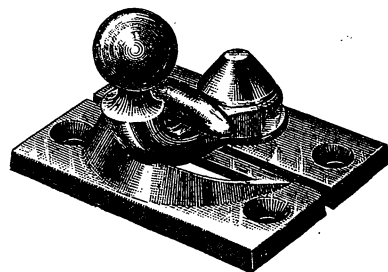
Self-Acting Sash Lock.

The Self-Acting Bell Company, Lancaster, Pa., Surpress, Dunn & Alder, 97

Chambers street, New York, sole agents, are marketing a sash lock, as here illustrated. The lock is constructed with an inclined plane, over which the lever on the upper sash passes in fastening. By pulling on the lever both sashes are drawn closely together at the meeting



rails, thus making the window secure and free from rattling. The company refer to the lock as unpickable, made so by the force with which the lever is brought into the incline. The lock is



Self-Acting Sash Lock.

made in solid bronze, bronze plated, copper plated, oxidized, and Boston bronze.

AT A JOINT MEETING of the stockholders and creditors of the Youngstown Stamping Company, held at Youngstown, Ohio, last week, it was decided not to take any steps looking to the taking of the business of the concern out of the hands of the receiver so long as the general depression in trade continues. For some months past the works of this concern have been operated under the management of W. C. Hine as receiver.

Steel Screens.

The Hendrick Mfg. Company, Carbon-dale, Pa., are introducing sand and coal screens, as shown in Figs. 1 and 2. The sand screen, Fig. 1, is made of Siemens-Martin flange steel, with side and ends flanged up out of the solid sheet, and the ends turned over to stiffen the

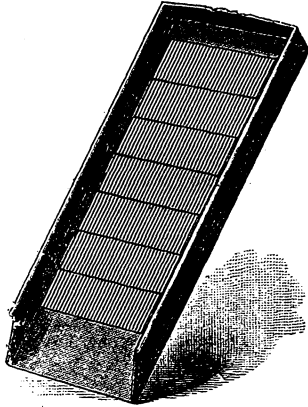


Fig. 1.—Flanged Steel Sand Screen.

screen and enable it to stand blows. The mesh is obtained by perforating a steel plate, which, it is stated, makes a durable screen, and one which sizes perfectly and cannot lose its mesh. This screen is intended for the use of masons, plasterers and foundrymen, and in actual service, it is claimed, has been found to afford the most satisfactory results. The screen, Fig. 2, is especially adapted to such heavy screening as

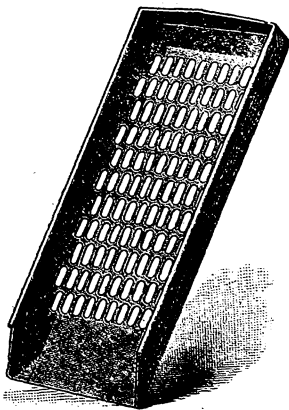


Fig. 2.—Coal and Gravel Screen.

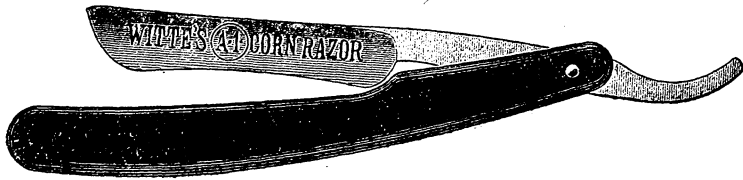
gravel, coal, coke and ore, and is made with such mesh as is best suited for the particular work in hand. The regular sizes of screens, of both forms, are the same, being made in the following sizes: 20 x 61 inches, 22 x 66 inches, and 24 x 71 inches. Special sized screens will be made to order. The manufacturers remark that the screens have been made to fill the demand for something better than the ordinary woven sand, coal and gravel screens, and that by doing away with wood work a screen is produced that is lighter and stronger than wire woven screens with wood frames.

Witte's A1 Corn Razor.

Alexis Witte, 47 Warren street, New York, is offering corn razors, as here-with illustrated. These are made of Wardlow's steel, handsomely finished and finely tempered, with hard rubber

handles. Attention is directed to the form of the cutting edge of the razor, this being considered best adapted to

hand doors and are made in large and small sizes, to be used on refrigerators and house doors. The goods are fin-



Witte's A1 Corn Razor.

the use for which they are intended. The razors measure $3\frac{1}{4}$ inches in length, and are put up in miniature cases.

ished in japan, galvanized, brass and nickeled.

The Conroy Hinge and Bolt.

P. J. Conroy & Co., Seventy-fifth street and Island avenue, Philadelphia, Pa., are putting the above goods on the market, as shown in the accompanying cuts. The hinge, Fig. 1, is described as being substantially made and well proportioned, having true joints, and

The Perfect Scraper or Cleaner.

The accompanying cut represents the above article, put upon the market by Corbin & Co., Owego, N. Y. The scraper or cleaner consists of a piece of sheet steel of different angles and curves, conforming to the shapes of the articles to be scraped or cleaned. This revolves in a metal handle; thus the edge desirable to use can be instantly applied.

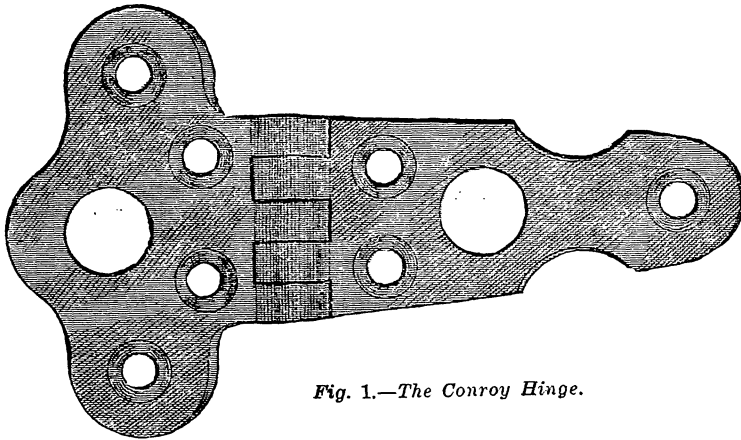
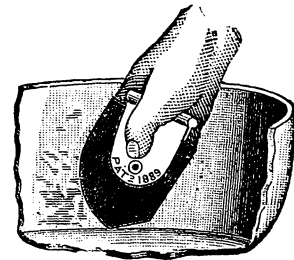


Fig. 1.—The Conroy Hinge.

as being finished all around. It is 5 inches long and is supplied in emery finish, polished and nickeled. The hinge is recommended by the manufacturers as suitable for refrigerators, ship and plumbers' supply dealers. In Fig. 2 a straight round bolt is represented with two eccentricities. When closing the door to fasten it the handle of the bolt is raised and the bolt slid into the keeper, after which the handle is pushed

The scraper is fastened to the handle by an open rivet, by which it can be hung up. The scraper is designed to remove burnt, incrustated food or other substances from cooking utensils of iron, tin, porcelain, earthenware or wood,



The Perfect Scraper or Cleaner.

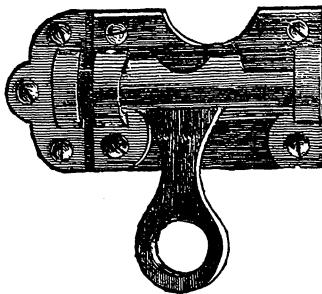


Fig. 2.—Conroy Door Bolt.

down to close the door tightly. The manufacturers claim that the bolt exerts no upward or downward strain upon the door, but a powerful inward pressure with a short leverage; also, that the bolt will force a door into position even if the latter is warped or sprung. The bolts are adapted for use on right or left

and is also recommended for removing dough from bread boards, paint from window glass, old varnish from wood, &c. The point is made that its use avoids the danger of cutting arms, hands or wrists, as often occurs when using knives.

JAMES ECKELS has been appointed receiver of the Vienna Stamping & Enameling Company of Chicago, whose works are at Porter, Ind. The failure was precipitated by an attachment filed by the Roessler & Hosslander Chemical Company. It is reported that the liabilities are \$80,000, and the assets \$60,000.

The Self-Heating Washer.

The Self-Heating Washing Machine Company, Evansville, Ind., are introducing the above article, as herewith

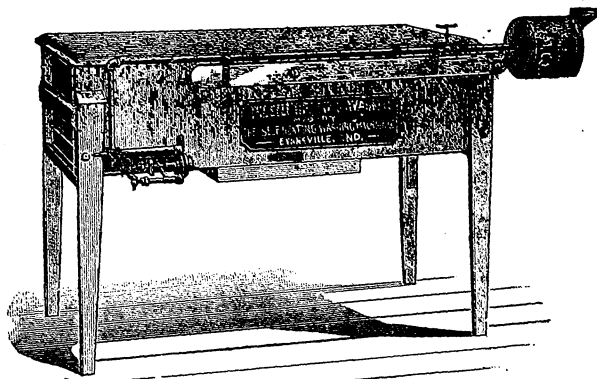


Fig. 2.—The Washer Closed.

shown. The washer is described as having the working parts made of oak, the box of hard maple and galvanized iron. The water is put into the washer,

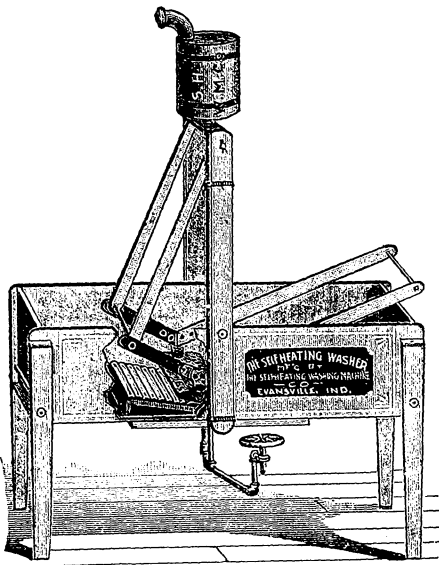
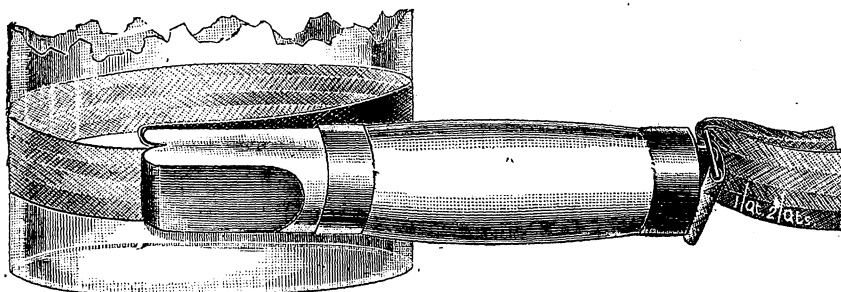


Fig. 1.—The Self-Heating Washer.

where the gasoline burner heats it, and keeps it hot as long as desired. The interior construction is shown in Fig. 1, which, it is remarked, is on the wash-board principle, and rubs the dirt out.



Preserve-Jar Holder.

In operation the clothes are moved over the rollers in the roller bed by the rub board, the latter having holes in it, to cause the suction to force the hot suds through the garments; this, together with the rubbing, to remove all dirt

and streaks. It is pointed out by the manufacturers that the operator can stand erect while using the washer; that a child ten years old can operate it; that it saves lifting clothes on and off a hot stove to boil them; that it

obviates the necessity of boiler, tubs, and washboards; that the machine has no geared wheels to be oiled; that the bottom will not shrink and leak in dry weather, and that the washer can be used to rinse clothes in. The burner can be swung to one side and used for making starch, heating irons, &c.

Preserve-Jar Holder.

Francis H. Loss, Jr., 33 Murray street, New York, is introducing the above device, as herewith illustrated. A band of strong web material passes through the center of the wooden handle, with an adjustable tongueless buckle at the end of the handle to hold the band, when adjusted to fit various sized jars. The band is marked to indicate where to place the center of the buckle to hold either pint, quart or 2-quart jars. The manufacturers claim that by using the holder all danger is avoided of injury to the hand by jars breaking or of burning the hand when putting up preserves; also that jars can be easily opened, however long a time they may have been closed.

Manufacturers whose works are located in towns of small population, where factories are few and news is scarce, are subjected to a great deal of annoyance owing to exaggerated reports sent out by newspaper men when it becomes necessary and wise to curtail their force or shorten the hours of labor in pursuance of that careful policy which

urer's customers and friends write or telegraph for information, and there is a great deal of worry for the owner of the plant, who should not be harassed at a time when he is trying to run his factory and furnish his employees with the means to procure bread and butter when his amount of available cash is limited by circumstances which he is powerless to control.

CONTENTS.

A Loud Telephone.....	299
The Sinking of the "Victoria." Illus....	299
A New Chicago Cable Line.....	301
Rod-Rolling Mills and Their Development in America. Illustrated.....	302
World's Fair Notes.....	303
The Sellers Gun Furnace.....	304
Blowing Engines. Illustrated.....	305
Self-Balancing Turbine.....	307
The Week.....	308
Editorials:	
Silver and the Debtor Class.....	309
Reductions in Wages.....	309
Industrial Growth Checked.....	309
The National Lead Company.....	310
Six Months' Bank Failures.....	310
Correspondence	310
Manufacturing:	
Iron and Steel.....	311
Machinery.....	312
Miscellaneous.....	312
Trade Report:	
Philadelphia.....	313
Chicago.....	314
St. Louis.....	314
Cincinnati.....	315
Pittsburgh.....	315
Boston.....	316
Cleveland.....	317
Louisville.....	317
Metal Market.....	317
Financial.....	318
New York.....	318
British Iron and Metal Markets... ..	318
Personal	319
Washington News...	319
Hardware:	
Condition of Trade.....	320
Notes on Prices	322
Meeting of the Rope Manufacturers...	323
Hardware Organizations and the Sher- man Bill.....	323
American Machinery in Great Britain..	324
Trade Items.....	324
Price-Lists, Circulars, &c.....	324
World's Fair Exhibits.....	325
Paints and Colors.....	325
The Evertz Detachable-Blade Razor. Illustrated.....	326
The Kodak Rat Trap. Illustrated.....	326
Hammerless Single Gun. Illustrated..	326
Self-Acting Sash Lock. Illustrated....	326
Steel Screens. Illustrated.....	327
Witte's A1 Corn Razor. Illustrated....	327
The Conroy Hinge and Bolt. Illus....	327
The Perfect Scraper or Cleaner. Illus..	327
The Self-Heating Washer. Illustrated.	328
Preserve-Jar Holder. Illustrated.....	328
Current Hardware Prices.....	329
Current Metal Prices.....	336

Current Hardware Prices.

AUGUST 16, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10@50&10&5 % signifies that the goods in question are sold at prices ranging from 10 to 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic..... \$ doz \$3.00, 38¢
Excelior..... \$ doz \$10.00..... 50&10&5
North..... \$ doz..... 11¢ net @ 10¢
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

Single Anvils, \$ 9¢..... 15&15&5
Peter Wright's..... 11&11
Armstrong's Pattern H. B. B. 10¢
Am. Wrought, Horseshoe brand 11&11
Trenton..... 10&10
Wilkinson's..... 10¢
Moore & James Mfg. Co..... 38¢

Anvil Vise and Drill—

Miller Falls Co., \$18.00..... 20¢
Cheney Anvil and Vise..... 25¢
Allen Anvil and Vise \$3.00..... 40&10
Star..... 45&5

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Common Augers and Bits..... 70&70&10
Boring Machine Augers..... 70&70&10
Car Bits, 12 in. twist..... 50¢
Russell Jennings' Augers and Bits 25&10
Jennings' Pattern H. B. B. 40¢
Jennings' Pattern Auger Bits..... 60¢
Snell's Bits..... 60&60
O. E. Jennings & Co., No. 10, extension 40¢
O. E. Jennings & Co., No. 80..... 40¢
O. E. Jennings & Co., Auger Bits, \$ 45
3 3/4 quarter in. 5 85 No. 80, \$3.50, 25¢
Lewis' Patent Single twist..... 45¢
Fugh's Black..... 20¢
Fugh's Jennings Pattern..... 30¢
L'Hommedieu Car Bits..... 15&10
Fortner Pat. Auger Bits..... 15¢
Cincinnati Bell-Hangers' Bits..... 30&10

Bit Stock Drills—

Horse Twist Drills..... 50&10&5
Standard..... 50&10&5
Cleveland..... 60&10&5
Syracuse, for metal..... 50&10
Syracuse, for wood (wood list) 30&30&5
Cincinnati, for wood..... 30&10
Cincinnati, for metal..... 45&10

Expansive Bits—

Clark's small, \$18; large, \$26. 35&35&10
Ives' No. 4, \$ doz. \$80..... 40¢
Swan's..... 40¢
Stearns' No. 1, \$20; No. 2, \$18..... 35&40
Stearns' No. 3, \$48..... 20¢

Gimlet Bits—

Common..... \$ gross \$2.75 @ \$3.25
Diamond..... \$ doz \$1.25..... 40&10
Bee..... 25&25&10
Double Cut, Shephard's..... 45&45&10
Double Cut, Ct. Valley Mfg. Co..... 30&10
Double Cut, Hartwell's..... 40&10
Double Cut, Douglass..... 40&10
Double Cut, Ives..... 60&60&10

Hollow Augers—

Ives' French, Swift & Co. (Beecher) 38¢ @ 33¢
Poglass..... 21¢
Honey's Adjustable, \$ doz \$48..... 60¢
Stearns'..... 20&20
Expansive, each \$4.50..... 60&60
Universal Expansive, each \$4.50..... 20¢
Wood's..... 25&25&10
Cincinnati Adjustable..... 25&10
Cincinnati Standard..... 25&10

Ship Augers and Bits—

L'Hommedieu's..... 15&10 @ 15&10&5
Watrous..... 25&25&10
Snell's..... 25&25&10
Snell's Ship Auger Pattern Bits 15&10 @ 15&10&5

Awl Hafts—See Hafts, Awl.

Awls—

Awls, Sewing, Common..... \$ gr. 85¢ @ 90¢
Awls, Should. Peg..... \$ gr. \$1.60 @ \$1.55
Awls, Pat. Peg..... \$ gr. 35¢ @ 38¢
Awls, Shouldered Brad..... \$ gr. \$1.20 @ \$1.40
Awls, Handled Brad..... \$ gr. \$2.60 @ \$3.00
Awls, Handled Scratch..... \$ gr. \$4.00 @ \$4.50
Awls, Socket Scratch..... \$ doz. \$1.10 @ \$1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Plain. Beveled.
First quality, best brands \$7.00 \$7.50
First quality, other brands \$6.75 7.00
Second quality..... 5.50 6.00

Axle Grease—See Grease, Axle.

Axles—

No. 1..... 3/4 @ 4/4, No. 2, 5/4 @ 6/4
No. 7 to 14..... 60&10
No. 15 to 18..... 47¢
No. 19 to 25..... 47¢
Concord Axles, loose collar..... 3/4 @ 6/4
Concord Axles, solid collar..... 5/4 @ 7/4
National Tubular Self Oiling..... 38¢ @ 33¢ @ 25¢

Bag Holders—See Holders, Bag.

Balances—

Spring Balances..... No. 2000 20 3/4 40¢
Chatillon, \$ doz..... \$0.80 0.95 1.75 net
Chatillon Straight Balances..... 40¢
Chatillon Circular Balances..... 50&10

Barb Wire—See Wire, Barb.

Bars—

Crow..... \$ doz 3/4
Iron, Steel Points..... \$ doz 3/4

Basins, Wash—

Standard Fiberware, No. 1, 10 1/2 in., \$1.80;
12 in., \$2.00; 13 1/2 in., \$2.50; 15 in., \$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82. 50&10 @ 50&10&5
Chatillon's No. 1..... 50¢
Chatillon's No. 2..... 50¢
Custer's..... 33¢

Beaters—

Egg—
Dover..... \$ doz \$1.00 @ \$1.20
Duplex (Standard Co.)..... \$ doz \$1.00
Dover (Standard Co.)..... \$ doz \$1.00
Dover Extra Heavy (Standard Co.) \$ doz. \$2.50
Bryant's..... \$ gross \$14.00
Double (H. & R. Mfg. Co.) \$ gro. No. 0 \$12.00; No. 1, \$15.00; No. 2..... \$36.00
Easy (H. & R. Mfg. Co.)..... \$ gro \$12.00
Triple (H. & R. Mfg. Co.)..... \$ gro \$16.50
Spiral..... \$ gro \$4.25 @ \$4.50
Improved Acme (H. & R. Mfg. Co.) \$ gro. \$9.00
Silver & Co..... \$ doz \$5.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;
No. 2, \$2..... 20¢

Bells—

Cow—
Common Wrought..... 60&10
Western, Sargent's list..... 70&10
Kentucky, "Star"..... 20&10
Kentucky, Sargent's list..... 70&10
Kentucky, Durham..... 70&10
Dodge, Genuine Kentucky..... 70&10
Texas Star..... 50&10 @ 50&10&5

Door—

Gong, Abbe's..... 33¢ @ 10¢
Gong, Yankee..... 45¢ @ 10¢
Gong, Barton's..... 40¢ @ 10¢
Crane, Brooks'..... 50¢ @ 10¢
Crane, Cone's..... 20¢ @ 10¢
Lever, Sargent's..... 60&10
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25&10
Lever, R. & E. Mfg. Co.'s..... 60&10
Full, Brooks'..... 60&10

Electric—

Wollensak's..... 20¢
Bigelow & Dowse..... 20¢

Hand—

Light Brass..... 70&10 @ 70&10&5
Extra Heavy..... 70¢
White..... 70¢
Silver Chime..... 33¢ @ 10¢
Globe Cone's Patent..... 25&10 @ 35¢

Miscellaneous—

Call..... 45¢ @ 50¢
Farm Bells..... \$ doz \$2.30
Steel Alloy Church and School Bells. 40¢

Bellows—

Blacksmiths'..... 60&10 @ 50&10&10
Molders'..... 40&10 @ 50¢
Hand Bellows..... 40&10 @ 50¢

Belting, Rubber—

Common Standard..... 75¢ @ 75¢ @ 10¢
Standard..... 70¢ @ 70¢ @ 10¢
Extra..... 60¢ @ 10¢ @ 80¢ @ 10¢
N.Y.B. & P. Co., Carbon..... 60¢ @ 80¢ @ 5¢
N.Y.B. & P. Co., Diamond..... 50¢ @ 80¢ @ 5¢
N.Y.B. & P. Co., Para..... 40¢ @ 40¢ @ 5¢

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Stoddard's Lightning Tire Upsetters..... 15¢
Detroit Perfect Tire Bender..... 15¢
Green River Tire Benders and Upsetters..... 20¢

Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron. 61¢ @ 61¢ @ 10¢
Moore's Novelty, Mal. Iron..... 50¢
Sure Grip Steel Tackle Block..... 25¢
See also Machines, Hoisting.

Boils—

Carriage, Machine, &c.—

Com. List June 10, '84..... 75¢ @ 10¢ @ 50¢
Genuine Eagle, Norway, List Oct. '84..... 80¢ @ 50¢ @ 10¢
Eagle, Norway, List Oct. '84..... 80¢ @ 10¢ @ 50¢
P.B. pattern, List Oct. 7, '84..... 80¢
R.B. & W., old list..... 70¢
Machine, List Jan. 1, 1890..... 80¢ @ 10¢
Bolt Ends, List Jan. 1, 1890..... 80¢ @ 10¢

Door and Shutter—

Cast Iron Barrel, Square, &c..... 70&10
Cast Iron Shutter Bolts..... 70&10
Cast Iron Chain (Sargent's list)..... 65&10
Ives' Patent Door Bolts..... 60&10 @ 60&10&5
Wrought Barrel..... 70&10 @ 75¢
Wrought Square..... 70&10 @ 75¢
Wrt Shutter, all Iron, Stanley's..... 60&10 @ 60&10&10
Wrt Shutter, Brass Knob..... 50¢ @ 50¢ @ 5¢
Wrt Shutter, Sargent's list..... 60&10
Wrt Sunk Flush, Sargent's list..... 60&10
Wrt Sunk Flush, Stanley's list..... 60&10 @ 10¢
Wrt B. K. Flush, Common..... 55&10

Stove and Plow—

Stove..... 60&10 @ 60&10&5
Plow..... 60&10 @ 50¢ @ 60&10&10
R. B. & W., Plow..... 55¢

Tire—

Common, List Feb. 28, '83..... 65¢ @ 65¢ @ 5¢
Port Chester Bolt and Nut Company..... 65¢
Empire list Feb. 28, '83..... 65¢
Keystone, Philadel., List Oct. '84..... 80¢
Norway, Phila., List Oct. '84..... 75¢
American Screw Company..... 75¢
Norway, Phila., List Oct. 16, '84..... 75¢
Eagle, Phila., List Oct. 16, '84..... 80¢
Elihu, List Oct. 16, '84..... 80¢
Bay State, List Feb. 28, '83..... 65¢
R. B. & W., Philadel., List Oct. 16, '84..... 80¢

Borers, Tap—

Common and Ring..... 20&10
Ives' Tap Borers..... 33¢ @ 25¢
Elihu Mfg. Co..... 33¢ @ 35¢
Clark's..... 33¢ @ 35¢

Borax—

Per lb..... 9¢ @ 10¢ @ 4¢

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon—

Per lb..... 2¢ @ 4¢
Boxes, Miter.
Spiker's Excelsior, 3 in. \$7.50, 4 in \$8.50, 5 in \$13.00, 6 in \$15.00..... 20¢

Braces—

American Bit Brace and Tool Co.
Nos. 10, 12, 20..... 60&10
Nos. 11, 21, 24, 27..... 70&10
Nos. 22, 23, 25..... 60&10 @ 5¢
Nos. 13, 26, 30, 37..... 70&10 @ 5¢
Barker's Imp'd Plain..... 75¢ @ 10¢ @ 80¢
Barker's Imp. Nickeled..... 65¢ @ 10¢ @ 70¢
Ratchet..... 75¢ @ 10¢ @ 80¢
Eclipse Ratchet..... 60¢
Globe Jawed..... 40¢ @ 40¢ @ 10¢
Corner Brace..... 40¢ @ 40¢ @ 10¢
Universal, 8 in., \$5.10; 10 in. \$6.25
Buffalo Ball..... \$1.10 @ \$1.15
Barber's..... 60¢ @ 10¢
Saxton's..... 75¢ @ 10¢ @ 80¢
Barker's Imp. Polished..... 75¢ @ 10¢ @ 80¢
Barker's Imp. Nickeled..... 65¢ @ 10¢ @ 70¢
Ratchet, Polished..... 60¢ @ 10¢ @ 60¢
Ratchet, Nickeled..... 40¢ @ 10¢ @ 40¢
Buffalo Ball..... net, \$1.10 @ \$1.15

Bartholomew's
Nos. 25, 27 and 30..... 50¢ @ 10¢ @ 60¢ @ 5¢
Nos. 117, 118, 119..... 70¢ @ 70¢ @ 5¢
Common Ball, American..... \$1.00 @ \$1.10
Fray's Genuine Spotted, 8 in. 50¢ @ 50¢ @ 10¢
Fray's Nos. 70 to 120, \$1 to 125, 20¢ to 41¢
Ives' New Haven Novelty..... 70¢ @ 70¢ @ 5¢
New Haven Ratchet..... 60¢ @ 50¢ @ 10¢
Barber Ratchet..... 60¢ @ 50¢ @ 10¢
Barber's..... 60¢ @ 50¢ @ 10¢
Spartan..... 60¢ @ 50¢ @ 10¢
P. S. & W. Co., Peck's Patent..... 60¢
Rose & Johnson..... 60¢
Davis Patent..... 50¢ @ 10¢

Brackets—

Shelf, plain..... 65¢ @ 70¢
Regular, list..... 60¢ @ 10¢ @ 70¢ @ 10¢
Sargent's list..... 70¢ @ 70¢ @ 10¢
Other makes at a wide range of prices.
Bradley Self Brackets..... 70&10

Bright Wire Goods—See Wire.

Broilers—

Hen's Self, 1 inch..... 9 10 9x11
Basting, } Per doz..... \$4.50 5.50 6.50
New Haven..... 60¢
Wire Goods Co..... 65¢ @ 10¢
Morgan Odorless..... \$ doz. \$12, 50¢
Queen City..... 33¢ @ 5¢

Buckets, Well—

Galvanized—
Hill's..... \$ doz. 12 qt. \$4.25; 14 qt. \$5.25
Iron Clack..... \$ doz. 14 qt. \$4.25 @ \$4.50
Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... \$ doz \$4.00

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers, Butcher's.

Brass—

Wrought Brass..... 80¢ @ 80¢ @ 10¢
Cast Brass, Tiebout's..... 50¢

Cast Brass, Fast..... 33¢ @ 10¢

Cast Brass, Loose Joint..... 33¢ @ 10¢

Cast Iron—

Fast Joint, Narrow..... 50&10 @ 50¢
Fast Joint, Broad..... 50&10 @ 50¢
Loose Joint, Japanned..... 75¢ @ 75¢ @ 10¢
Loose Joint, Jap. with Acorns..... 75¢ @ 75¢ @ 10¢
Parliament Butts..... 75¢ @ 75¢ @ 10¢
Mayer's Hinges..... 75¢ @ 75¢ @ 10¢
Loose Pin, Acorns..... 75¢ @ 75¢ @ 10¢
Loose Pin, Acorns, Japanned..... 75¢ @ 75¢ @ 10¢
Loose Pin, Acorns, Japanned..... 75¢ @ 75¢ @ 10¢
Plated Tips..... 75¢ @ 75¢ @ 10¢

Wrought Steel—

Fast Joint, Narrow..... 50&10 @ 50¢
Fast Joint, Lt. Narrow..... 50&10 @ 50¢
Fast Joint, Broad..... 50&10 @ 50¢
Loose Joint, Broad..... 50&10 @ 50¢
Table Butts, Back Flaps, &c..... 50&10 @ 50¢
Inside Blind, Regular..... 50&10 @ 50¢
Inside Blind, Light..... 50&10 @ 50¢
Loose Pin..... 50&10 @ 50¢
Bronzed Wrought Butts..... 50&10 @ 50¢

Callipers—See Compasses.

Calks, Toe—

Gautier, One Prong, Blunt..... 5¢ @ 5¢ @ 10¢
Burke's One Prong, Blunt..... 5¢ @ 5¢ @ 10¢
Burke's, Two Prong, Blunt..... 5¢ @ 5¢ @ 10¢
Burke's, One Prong, Sharp..... 5¢ @ 5¢ @ 10¢

Can Openers—See Openers, Can.

Cans, Milk—

S. S. & Co., 5-gal., \$3.00; 8-gal., \$4.40;
10-gal., \$4.75 each..... 40&10

Cans, Oil—

Galvanized Blue Band, 5 gal., Tip-Top, \$ doz. \$12.00
Galvanized Blue Band, 5 gal., Faucet, \$ doz., \$8.00
Galvanized Blue Band, 1 gal., \$ doz. \$2.25
Glass Oil, Friend..... \$ doz. \$2.75

Caps—

Percussion—
Hicks & Goldmark's and Union Metallic Cartridge Co. \$ 1000
P. L. Waterproof, 1-10's..... 35¢ @ 27¢
E. B. Trimmed Edge, 1-10's..... 35¢ @ 27¢
E. B. Grnd. Edge, Cent. Fire, 1-10's..... 47¢ @ 50¢

Musket, Waterproof, 1-10's..... 50¢ @ 53¢
G. D..... 27¢ @ 30¢
S. B. Genuine Imported..... 45¢ @ 48¢
Eley's E. B..... 66¢ @ 68¢
Eley's D Waterproof, Central Fire..... \$1.00

Primers—

Berdan Primers, \$1.00..... 25¢
B. L. Caps (Sturtevant Shells) \$1.00..... 25¢
All other Primers, \$1.20..... 25¢

Cards—

Watson's Cotton, Wool, Horse and File, List January 28, 1891..... 25¢

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Rim Fire Cartridges..... 50&50&5
Rim Fire Military..... 15&15
Cent. Fire, Pistol and Rifle..... 25&25&10
Cent. Fire, Military and Sporting..... 15&15
Blank Cartridges, except 22 and 32 cal., additional 10¢ to above discounts.
Blank Cartridges, 22 cal., \$1.75..... 25¢
Blank Cartridges, 32 cal., \$3.50..... 25¢
Primed Shells and Bullets..... 15&15&5
B. B. Caps, Round Ball, \$1.75..... 25¢
B. B. Caps, Con. Ball, Swgd., \$2.00..... 25¢

Carpet Sweepers—

Casters—

Bed..... } Brass..... 55¢ @ 55¢ @ 10¢
Plate..... } Others..... 60¢ @ 60¢ @ 10¢
Shallow Socket..... 60¢ @ 60¢ @ 10¢
Deep Socket..... 40¢ @ 10¢
Martin's Patent (Phoenix) 45¢ @ 10¢ @ 10¢
Tucker's Patent, low list..... 45¢
Payson's Anti-friction..... 70¢ @ 70¢ @ 10¢
Payson's Truck Casters..... 60¢ @ 60¢ @ 10¢
Yale Casters, low list..... 70¢
Yale, Gem..... 70¢
Giant Truck Casters..... 35¢
Stationary Truck Casters..... 60¢ @ 10¢
Socket Truck Casters..... 60¢ @ 50¢ @ 10¢
Gwinner's Common Sense..... 45¢
Gwinner's Hercules..... 45¢

Cattle Leader—

See Leaders, Cattle.

Cement—

Victor Elastic..... 5 lb pails \$ 5 50

Chain—

Trace, Wagon and Fancy Chains, List revised May, 1893..... 60¢ @ 60¢ @ 10¢
American Coil, in cash lots,
3-16 1/2 4-16 1/2 5-16 1/2 6-16 1/2 7-16 1/2 8-16 1/2 9-16 1/2 10-16 1/2 11-16 1/2 12-16 1/2 13-16 1/2 14-16 1/2 15-16 1/2 16-16 1/2 17-16 1/2 18-16 1/2 19-16 1/2

Chalk Lines—See Lines.	
Checks, Door—	50%
Chisels—	
Socket Framing and Firmer	
F. S. & W.	
New Haven.	
Wetherby.	75% to 100% to 100%
Mir.	
Ohio Tool Co.	
Dougllass.	75% to 75%
Buck Bros.	30%
Merrill.	60% to 100% to 100%
L. & I. J. White.	30% to 30%
Tanged and Miscellaneous.	
Tanged Firmers.	50% to 50%
Butchers.	\$4.75 to \$5.00
Spears & Jackson's.	\$5 to 2
Buck Bros.	30%
Cold Chisels, # 1.	15 to 16
Chucks—	
Beach Pat.	each, \$8.00.
Morse's Adjustable, each.	\$7.00, 20 to 25
Danbury.	each, \$6.00, 30 to 35
Syracuse Balz Pat.	
Waltham Pat.	33%
Knapp's Patent Chucks.	
Combination Lathe Chucks.	33%
Universal Lathe Chucks.	40%
Independent Lathe Chucks.	40%
Drill Chucks.	15%
Union Mfg. Co.	
Victor.	\$8.50, 25%
Combination.	40%
Universal.	40%
Independent.	40%
Churns—	
Timin Union, each, 5 gal.	\$3.25; 7 gal., \$3.75; 10 gal., \$4.25.
McDermald Star Barrel Churn, each	6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25.
Clamps—	
E. L. Tool Co.'s Wrought Iron.	25%
Adjustable, Cincinnati.	15 to 15
Adjustable, Cincinnati.	15 to 15
Adjustable, Cincinnati.	30 to 30
Stearns' Adjustable Cabinet and Corner.	30 to 30
Cabinet, Sargent's.	70 to 10
Carriage Makers', Sargent's.	75 to 75
Carriage Makers', P. S. & W. Co.	40 to 10
Eberhard Mfg. Co.	40 to 10
Warner's.	40 to 10
Saw Clamps, see Vises, Saw Filers.	
Carpenter's, Cincinnati.	25 to 10
Barnes' Machinists' Clamps.	33%
Cleavers, Butchers—	
Bradley's.	25 to 30
L. & I. J. White.	20 to 25
Beatty's.	40 to 40
New Haven Edge Tool Co.'s.	40%
F. S. & W.	33% to 33%
Foster Bros.	30%
Schulte, Lohoff & Co.	40 to 40
Clips—	
Norway Axle, 1/4 & 5-16.	55 to 55
4 grade Norway Axle, 1/4 & 5-16.	65 to 65
Superior Axle Clips.	60% to 60%
Norway Spring Bar Clips, 5-16.	30 to 30
Wrought Iron Felloe Clips, 5-16.	60%
Steel Felloe Clips.	25%
Baker Axle Clips.	25%
Cloth and Netting, Wire	
—See Wire, &c.	
Cockeyes—	50%
Cocks Brass—	
Hardware list.	60 to 2%
Coffee Mills—See Mills, Coff.	
Collars, Dog—	
Chapman Mfg. Company, new list.	40%
Medford Fancy Goods Co.	40 to 10
Embossed, Gilt, Pope & Stevens' list.	30 to 1%
Leather, Pope & Stevens' list.	40%
Brass, Pope & Stevens' list.	40%
Combs, Curry—	
Fitch's.	50% to 100% to 100%
Rubber, per doz.	\$10.00.
American Curry Comb Co.	33% to 40%
Kohler's Magic Oscillating.	20%
Kohler's Humane.	20%
Compasses, Dividers, &c.	
Compasses, Callipers, Dividers.	70 to 10
Bemis & Call Co.'s	
Dividers.	65%
Compasses.	50 to 55
Callipers, Inside or Outside.	65%
Callipers, Wing.	60%
Callipers, Double.	65%
Callipers, Call's Patent Inside.	55%
Excelsior.	50%
Stevens & Co.'s.	25 to 10
Starrett's	
Spring Callipers and Dividers.	25 to 10
Lock Callipers and Dividers.	25%
Combination Dividers.	25%
Coolers, Water—	
S. S. & Co.: 2-gal., \$2.00; 3-gal., \$2.50;	
1-gal., \$2.75; 6-gal., \$4.40 each.	33%
Coopers' Tools—	
—See Tools, Coopers.	
Cord—	
Sash—	
Common.	25%
Patent, good quality.	10 to 11
White Cotton Braided, fair.	23 to 24
Common Russia Sash.	12 to 13
Patent Russia Sash.	13 to 14
Cable Laid Italian Sash.	19 to 20
India Cable Laid Sash.	11 to 12
Silver Lake.	
A quality, White, 50#.	25%
B quality, White, 30#.	10%
B quality, White, 30#.	10%
B quality, White, 30#.	10%
Sylvan Spring, Extra Braided, White.	34%
Sylvan Spring, Extra Braided, Drab.	39%
Semper Idem, Braided, White.	27 to 28
Egyptian, India Hemp, Braided.	26%
Massachusetts, White.	29%
Samson.	
Braided, White Cotton.	37%
Braided, Drab Cotton.	42%
Braided, Italian Hemp.	40%
Braided, Linen.	56%
Tate's Solid Braided—	
Hercules, White.	25%
Hercules, Drab.	30%
Economy Drab.	27%
Economy White.	22%
OSAWAN Mills—	
Braided Giant, White.	20%
Braided Giant, Drab and Fancy.	25%

Braided, Crown White, # 1, 50#.	50%
Braided, Crown Drab and Fancy, # 1.	50%
Wire Picture—	
Braided or Twisted.	80 to 80
Corkscrews—See Screws, Cork.	
Corn Knives and Cutters	
—See Knives, Corn.	
Crackers Nut—	
Table (H. & B. Mfg. Co.)	40%
Blake's Pattern, # doz.	\$2.00.
Turner & Seymour Mfg. Co.	50%
Acme.	
Japanned, # gro.	\$30.
Nickel Plated, # gro.	\$30.
Cradles—	
Grain.	50 to 20 to 50 to 50
Crayons—	
White Crayons, # gross.	7 to 8
D. M. Stewart Mfg. Co.: Metal Workers' # gross.	\$1.75.
Rolling Mill, # gross.	2.50.
Railroad, # gross.	2.00.
Soapstone Pencils, # gross.	1.00.
See also Chalk.	
Creamery Pails—See Pails, Creamery.	
Crow Bars—See Bars, Crow.	
Curry Combs—	
See Combs, Curry.	
Curtain Pins—	
See Pins, Curtain.	
Cutters—	
Meat—	
Dixon's, # doz.	40 to 40
Nos.	3 4
Each.	\$14.00 \$17.00 \$19.00 \$30.00
Woodruff's, # doz.	40 to 40
Nos.	100 150
Each.	\$15.00 \$18.00
Hale's, # doz.	1 12 10%
Nos.	1 12 10%
Each.	\$27.00 \$33.00 \$45.00
American.	1 2 3 4 5 30%
Nos.	1 2 3 4 5 30%
Each.	\$5 \$7 \$10 \$25 \$50 \$80
Enterprise.	25%
Nos.	10 12 22 32 42
Each.	\$3 \$3 \$3 \$3 \$3 \$3
Little Giant, # doz.	\$3 \$3 \$3 \$3 \$3 \$3
Nos.	305 310 312 320 322
Each.	\$35.00 \$48.00 \$44.00 \$72.00 \$68.00
Triumph No. 505, # doz.	\$21.00, 25 to 30%
Miles' Challenge, # doz.	\$46 to \$46 to 10%
Nos.	2 3 4
Each.	\$22.00 \$30.00 \$40.00
Home No. 1, # doz.	\$28.00, 55 to 10%
Draw Cut, each:	
Nos. 5 2 6 8	
Each.	\$50 \$75 \$80 \$225.
Beef Shavers (Enterprise).	20%
Chadborn's Smoked Beef Cutter, # doz.	\$66.00
Slaw and Kraut—	
Tucker & Dorsey Mfg. Co.	
Slaw Cutters, 1 Knife, # gross.	\$21.00
Slaw Cutters, 2 Knife, # gross.	30.00
Kraut Cutters.	40%
Tobacco—	
Champion.	20 to 10 to 30%
All Iron.	20 to 10 to 30%
Nichols Lock Co.'s, # doz.	\$18.00, 50 to 55%
Wilson's.	20 to 10 to 30%
Sargent's.	20 to 10, 55 to 10
Acme.	20 to 10, 55 to 10
Washer—	
Smith's Pat.	20 to 10, 20 to 10 to 10%
Johnson's.	20 to 10, 33 to 4%
Penny's, # doz.	Pol. 1/4; Jap'd, \$18. 55%
Appleton's.	20 to 10, 18.00, 60 to 10
Bonney's.	20 to 10, 30 to 10
Cincinnati.	25 to 10%
Diggers, Post Hole, &c.—	
Samson, # doz.	\$34.00.
Fletcher Post Hole Augers, # doz.	\$38.00, 20 to 10 to 10%
Eureka Diggers.	20 to 10 to 10%
Vaughan's Post Hole Auger, # doz.	\$8.50 to \$9.50
Kohler's Little Giant.	20 to 10, 18.00
Kohler's Hercules.	20 to 10, 14.00
Kohler's Invincible.	20 to 10, 12.00
Kohler's New Champion.	20 to 10, 8.00
Schneider.	20 to 10, 18.00
Cronk's Post Bars, # doz.	\$6.00 to \$6.00 to 10%
Gibbs' Post Hole Digger.	20 to 10, 15.00
Gibbs' National.	20 to 10, 12.00
Gibbs' Columbia.	20 to 10, 13.00
Gibbs' Imperial.	20 to 10, 7.50
Shimer's Hollow Handle.	20 to 10, 24.00
Gem, Improved # doz.	\$9.00 to \$10.00 net
Dividers—See Compasses.	
Dog Collars—See Collars, Dog.	
Door Checks—	
See Checks, Door.	
Door Springs—	
See Springs, Door.	
Drawers.	
Money, # doz.	\$18 to \$20
Waddell's Improved, # doz.	\$15.00
Drawing Knives—	
See Knives, Drawing.	
Drills and Drill Stocks—	
Blacksmith's.	each \$1.75
Blacksmith's Self-Feeding, each	\$7.50, 20%
Preast, F. S. & W.	40 to 10
Preast, Wilson's.	30 to 10
Preast, Millers Falls.	each \$3.00, 25%
Preast, Bartholomew's.	each \$2.50
Ratchet, Merrill's.	25 to 10 to 40%
Ratchet, Ingersoll's.	20 to 10 to 25%
Ratchet, Parkers.	20 to 10 to 25%
Ratchet, Whitney's.	20 to 10 to 25%
Ratchet, Weston's.	20 to 10 to 25%
Ratchet, Moore's Triple Action.	25 to 30%
Ratchet, Curtis & Curtis.	30%
Whitney's Hand Drill, Plain.	\$11.00.
Adjustable, \$12.00.	20 to 10%
Automatic Boring Tools.	\$1.75 to \$1.75
Chicago Automatic Drill.	20 to 10
Goodell Automatic Drills.	40 to 5%
Twist Drills—	
Cleveland.	50 to 10 to 10%
Diamond, W. & B.	50 to 10 to 10%
Graham's Pat. Groove Shank.	50 to 10 to 10%
Morse.	50 to 10 to 10%
Newstead.	50 to 10 to 10%
Standard.	50 to 10 to 10%
Syracuse (Metal list).	50 to 10%

Drill Bits or Bit Stock	
Drills—See Augers and Bits.	
Drill Chucks—See Chucks.	
Dripping Pans—	
See Pans, Dripping.	
Drivers, Screw—	
Dougllass Mfg. Co.	20 to 20 to 10%
Dist. only.	50%
Buck Bros.	30%
Stanley R. & L. Co.'s	
No. 64, Varinshed Handles.	65 to 10%
No. 86.	70 to 10%
Sargent & Co.'s	
No. 1, Forged Blade.	60 to 10 to 10%
Nos. 20, 40 and 60.	60 to 10 to 10%
P. S. & W.	70%
Knapp & Cowley.	
No. 1.	60 to 20 to 70%
No. 2.	60 to 10 to 10 to 70 to 5%
No. 8.	60 to 5 to 60 to 10%
Nos. 4 and 00, Acme and Ideal.	50 to 5%
Stearns.	25 to 10%
Gay & Parsons.	25 to 10 to 5%
Champion.	25 to 10%
Clark's Pat.	30 to 33 to 4%
Ellrich's Socket and Ratchet.	25 to 25 to 10%
Allard's Spiral, new list.	25%
Kob's Common Sense.	# doz., \$6.00.
Syracuse Screw-Driver Bits.	30 to 30 to 5%
Screw Driver Bits.	# doz., 50 to 75%
Screw Driver Bits, Parr's.	# gross, \$6.25
Fray's Hol. H. die Sets.	No. 3, \$12.00, 45%
Cincinnati.	25 to 10%
Trace Screw Drivers.	25 to 10%
Buck Bros' Screw Driver Bits.	27 to 4%
Goodell's Automatic.	50%
Mayhew's Black Handle.	50%
Mayhew's Monarch.	45 to 10%
C. T. Williamson Wire Novelty Co.	50%
Egg Beaters—See Beaters, Egg	
Egg Poachers—	
See Poachers, Egg.	
Electric Bell Sets—	
See Bells, Electric.	
Emery—No. 4 to No. 54 to Flour, CF.	
46 gr. 150 gr. F.F.F.	
Kegs, # 1 doz.	4 1/2 5 2 1/2
4 1/2 kegs, # 1 doz.	4 1/2 5 2 1/2
4 1/2 kegs, # 1 doz.	4 1/2 5 2 1/2
10-1/2 kegs, # 1 doz.	4 1/2 5 2 1/2
In case.	6 6 6 5
10-m cans, less	than 10.
10 10 10 7 1/2	
Enameled and Tinned Ware—See Ware, Hollow	
Escutcheon Pins—	
See Pins, Escutcheon.	
Escutcheons—	
Door, Same dis. as Door Locks.	
Brass Thread.	60 to 60 to 10%
Wood.	25%
Expanded Metal—	
List No. 5.	
Lathing.	10%
Fencing, Painted Sheet.	20%
Netting, Painted Sheet.	20%
Door Mats, Galvanized.	25%
Window Guards, Paneled.	15%
Tree Guards, Paneled.	15%
Extractors, Lemon Juice	
—See Squeezers, Lemon.	
Fasteners, Blind—	
Mackrell's, # doz.	\$1.00.
Van Sand's Screw Pat. #15 gr.	60 to 10%
Van Sand's Old Pat. #15 gr.	55 to 10%
Austin & Eddy No. 2008.	# gr., \$9.00
Zimmerman's.	# gr., \$9.00
Zimmerman's.	# gr., \$9.00
Faucets—	
Fenn's.	40%
Fenn's Cork Stops.	33 to 4%
Star.	60%
Frary's Pat. Petroleum.	60%
F. & L. B. Co.	
West's Lock, Open and Shut Key.	50%
Star, Metal Plug, new list.	40%
Lockart, Metal Plug, reduced list.	60%
Metallic Key, Leather Lined.	60 to 10%
Cork Lined.	70 to 5 to 70 to 10%
Burnside's Red Cedar.	50%
Burnside's Red Cedar, bbl. lots.	50 to 10%
John Sommers'	
Best Red Cedar Tin Key.	40%
DLX, 1st quality, Cork Lined.	50%
Diamond Lock.	40%
Perfection, Fla. Red Cedar (in boxes).	40%
Boss Metallic Key.	50%
Reliable Cork Lined.	60%
O. K. Western Pattern Cork Lined.	50%
No. 6 Brand, Red Cedar (in bbls.).	50 to 10%
Western Pattern Metal Key.	40%
No Brand Metal Key.	60%
Self Measuring.	
Enterprise, # doz.	\$36.00.
Lane's # doz.	\$36.00.
Felice Plates—	
See Plates, Felice.	
Fibre Ware—See Ware, Fibre.	
Fifth Wheels—	
Derby and Cincinnati.	45 to 5%
Brewster.	50 to 5%
Files—	
Domestic—	
Nicholson Files, Raps, &c.	60 to 10 to 5%
Nicholson (X.F.) Files.	60 to 10 to 10%
Nicholson's Patent Files (Second).	75%
(extra price on certain sizes)	
American.	60 to 10 to 60 to 10 to 5%
G. & H. Barnett (Black Diamond)	60 to 10 to 60 to 10 to 5%
Arcade.	60 to 10 to 60 to 10 to 5%
Eagle.	60 to 10 to 60 to 10 to 5%
Other makers, best brand.	60 to 10 to 60 to 10 to 5%
First brand.	70 to 10 to 70 to 10 to 5%
Second quality.	80 to 80 to 5%
Heller's Horse Raps.	50 to 7 to 50 to 10%
McCaffrey's Horse Raps.	50 to 10%
Chelsea Horse Raps, Hand Cut.	50 to 10%
Arcade Horse Raps.	60 to 10 to 60 to 10 to 5%
Trojan Horse Raps.	60 to 10 to 5%
Importers—	
Butcher.	Butcher's list 25 to 30%
Stubs.	

Fixtures Grindstone—	
Sargent's Patent.	70 to 10%
Reading Hardware Co.	50 to 10%
F. S. & W. Co.	50 to 10%
Moore's.	50 to 10%
Fluting Machines—	
See Machines, Fluting.	
Fluting Scissors—	
See Scissors, Fluting.	
Fodder Squeezers—	
See Squeezers, Fodder.	
Forks—	
Hay, Manure, &c. Asso. List.	70 to 70 to 5%
Hay, Manure, &c. Phila. List.	50 to 50 to 10 to 5%
Plated, see Spoons.	
Frames—Saw—	
White Vermont.	# gro., \$9.00, \$10.00
Red, Polished and Varinshed.	# doz., \$1.50, 5%
Screen, Window and Door—	
Porter's Pat. Window and Door Frame.	33 to 10%
Warner's Screen Corner Irons.	33 to 10%
Stearns' Frames and Corners.	25 to 25 to 10%
Cortland.	40 to 40 to 5%
Phillips' Window Screen Frames.	50 to 50 to 5%
Bonanza Window Screens.	50 to 50 to 10%
Empire Fancy Screen Doors.	# doz., \$19
Freezers Ice Cream—	
White Mountain.	60 to 60 to 5%
Granite State.	65 to 65 to 5%
Arctic.	70 to 70 to 5%
American.	60%
Buffalo Churn.	65 to 65 to 5%
Shepard's Lightning.	65 to 65 to 5%
Gem.	65%
Blizzard.	70%
Double Action Crown.	60%
Crown.	60%
Star.	60%
Pearless.	60 to 10%
Glant.	60%
Zero.	60%
Boss and Pat.	60 to 10 to 10 to 10%
Keystone, P. D. & Co., each.	\$1.50, 20%
Standard.	60 to 60 to 5%
Standard Double Action.	60 to 60 to 5%
Good Luck.	65 to 65 to 5%
Model.	60 to 60 to 5%
Confectioners' Machine.	60%
Fruit and Jelly Presses—	

100

Brittan, Graham & Mathes, list Jan. 1890. 60@10@10%
 Plate. 33@22%
 Barnes Mfg. Co. 40@40@10%
 net price
 Delta Flat Key. 15%
 Romer's Night Latches. 50@10%
 Brooklyn Latches. 50@10%
 Warner's Burglar Proof. 50@10%
 Elevator—

Moore's. 33@22%
 Padlocks—

List June 10, 1891. 50@2%
 Norwich Lock Mfg. Co., old list. 50@2%
 Yale Lock Mfg. Co.'s. net price
 Eureka, Eagle Lock Co. 40@2%
 Romer's Nos. 0 to 91. 30%
 Romer's Scandinavian, &c., Nos. 100 to 505. 15%
 A. E. Deitz. 40%
 Champion Padlocks. 40%
 Hotchkiss. 60%
 Harsco. 60%
 Horselocks. 60%
 Barnes Mfg. Co. 40@40@10%
 Nook's. 30%
 Scandinavian. 30@40%
 E. T. Fraim's Keystone Scandinavian. 30@40%
 Nos. 119, 120, 130 and 140. 30@10%
 Other Nos. 65%
 Ames Sword Co. up to No. 150. 40%
 Ames Sword Co. above No. 150. 50%
 Slaymaker, Barry & Co. 90@5%
 No. 1010 line. 50%
 No. 41 line. 50%
 No. 61 line. 60%
 No. 21 line. 80%

Sash, &c.—
 Clark's No. 1, 10; No. 2, 33 gr. 33@4%
 Ferguson's. 33@4%
 Victor. 60@10@2%
 Walker's. 10%
 Atwell Mfg. Co. 25@33@4%
 Reading. 66@10@66@10@10%
 Hammond's Window Springs. 40%
 Common Sense, Jap'd, Cop'd and Br'd. gr \$4.00
 Common Sense, Nickel Plated. gr \$10.00
 Universal. 30%
 Kempshall's Gravity. 60%
 Kempshall's Model. 60@60@10%
 Corbin's Daisy, list Feb. 15, 1888. 70%
 Payson's Perfect. 60@10@10%
 Huganin's Sash Balances. 25@25%
 Huganin's New Sash Locks. 25@25%
 Ives Patent. 60@10@5@60@10@10%
 Fish (Liesche's pat.), No. 100, gr. \$3. 50%
 No. 105, gr. \$10. 50%
 Davis, Bronze, Barnes Mfg. Co. 60%
 Champion Safety list January, 1893. 70@5%
 Security. 70%
 Giant, list Jan. 1892. 70@5%
 Wolcott's. 60@10@2%
 Monarch. 50%

Lumber Tools—
 See Tools, Lumber.
 Lustr—
 Four-ounce bottles. 50 doz, \$1.75; 50 gross. \$17.00
 Machines.

Boring—
 Without Augers. Upright. Angular.
 Douglas. \$5.50 \$6.75. 50%
 Snell's, Rice's Pat. 5.50 6.75. 40@10@10%
 Jennings. 5.50 6.75. 45@10%
 Other Machines. 2.35 2.75.
 Phillips' Patent
 with Auger. 7.00 7.50.
 Miller's Falls. 7.50
 Boss, Carpenters'. 3.85
 Boss, Ship Builders'. 3.85

Fluting—
 Knox, 4 1/2-inch Rolls. \$3.25 each 35%
 Knox, 6-inch Rolls. \$3.60 each 35%
 Eagle, 3 1/2-inch Rolls. \$2.15 35%
 Eagle, 5 1/2-inch Rolls. \$2.85 35%
 Crown, 4 1/2 in. \$3.50; 6 in. \$4.00; 8 in. \$4.50 each. 35%
 Crown Jewel, 6 in. \$3.50 each. 35%
 American, 5 in. \$3.00; 6 in. \$3.40; 7 in. \$4.50 each. 35%
 Domestic Fluter. each, \$1.50
 Geneva Hand Fluter, White Metal. 50 doz \$12.25
 Crown Hand Fluter, No. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25. 30%
 Shepard Hand Fluter, No. 85, per doz \$15.50. 40%
 Shepard Hand Fluter, No. 110, 40%
 \$11.00. 40%
 Shepard Hand Fluter, No. 95, 40%
 \$5.00. 40%
 Combined Fluter and Sad Iron. 30%
 \$15.00. 30%

Holisting—
 Moore's Hand Holist, with Lock Brake. 20%
 Moore's Anti-Friction Differential Pulley Block. 20%
 Moore's Rope Differential Pulley Block. 80%
 Energy Mfg. Co.'s. 25%
 See also Blocks.
 Washing—
 Anthony Wayne, 50 doz, No. 1, \$42; No. 2, \$36; No. 3, \$42.
 Wayne American. 50 doz \$38.00
 Western Star 50 doz, No. 2, \$36; No. 3, \$39.
 Wells. 50 doz \$54.00
 Fair and Square. 50 doz \$42.00

Mallets—
 Hickory. 20@10@20@10@10%
 Lignumvite. 20@10@20@10@10%
 B. & L. Block Co., Hickory & L. V. 30@30@10
 \$20.00
 Mallets—Regular list. 60@10@60@10@25%
 Measures—
 Standard Fiberware, No. 1, peck 50 dozen, \$3.50; 1/2 peck, \$3.00
 Meat Cutters—
 See Cutters, Meat.
 Menders, Harness—
 Per doz. \$2.00
 Milk Cans—See Cans, Milk.

Mills—
 Coffee—
 Box and Side, list Jan. 1, 1888. 60@60@5%
 Net prices are often made which are lower than above discount.
 American, Enterprise Mfg. Co., list Jan. 17, 1893. 20%
 The Swift, Lane Bros. 30%
 Waddell's New Box Mills, Ideal Brand, New List. 60%

Mincing Knives—
 See Knives, Mincing.
 Molasses Gates—
 See Gates, Molasses.
 Money Drawers—
 See Drawers, Money.
 Mowers, Lawn—

Best Machines: 10-in., \$4; 12-in., \$4.50; 14-in., \$5; 16-in., \$5.50; 18-in., \$6.
 Low-Grade Machines:
 10-in. \$3; 12-in., \$3.25 14-in., \$3.50 each
 Muzzles—
 Safety. 50 doz, \$3.00, 25%

Nails—
 Cut and Wire. See Trade Report.
 Wire Nails, Papered.
 Association list, May 1, '92. 85@5%
 Tack Mfrs.' list. 70@5@70@10%
 Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—
 Nos. 6 7 8 9 10
 American. 9% 9% 9% 9% 9% net
 Ausable. 28% 26% 25% 24% 23% 40@5@2%
 Clinton, Fin. 19% 17% 16% 15% 14% 30@5%
 Essex. 28% 26% 25% 24% 23% 40@10@50%
 Lyra. 9% 9% 9% 9% 9% net
 Snowden. 9% 9% 9% 9% 9% net
 Standard. 23% 21% 20% 19% 18% 35%
 Vulcan. 23% 21% 20% 19% 18% 35%
 Northwest'n. 25% 23% 22% 21% 20% 25@25@5%
 C. B. K. 25% 23% 22% 21% 21% 40%
 A. C. 25% 23% 22% 21% 21% 40@10%
 Maud S. 25% 23% 22% 21% 21% 50@10@5%
 Champlain. 28% 26% 25% 24% 23% 40@5@2%
 Champion. 25% 23% 22% 21% 20% 10@10@10%
 Capewell. 19% 18% 17% 16% 16% 10@5%
 Anchor. 23% 21% 20% 19% 18% 35%
 Western. 23% 21% 20% 19% 18% 50%
 Empire Bronzed. 13@14% D

Picture—
 Brass Head, Sargent's list. 60@60@10%
 Brass Head, Combination list. 50@10%
 Porcelain Head, Sargent's list. 50@10@10%
 Porcelain Head, Combination list. 40@10%
 Niles' Patent. 40%
 Nail Pullers—See Pullers, Nail.
 Nail Sets—See Sets, Nail.
 Nut Crackers—
 See Crackers, Nut.
 Nuts—List Dec. 18, 1889.

Oakum—
 Best or Government. 50 doz \$7.40
 U. S. Navy. 50 doz \$6.00
 Navy. 50 doz \$5.50
 Oil Tanks—See Tanks, Oil.
 Oilers—
 Zinc and Tin. 65@10@70@5%
 Brass and Copper. 50@10@50@10@5%
 Malleable, Hammers' Improved, No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40 10@10@25%
 Malleable, Hammers' Old Pattern, same list. 45%
 Prior's Pat. or "Paragon" Zinc. 60@10@10%
 Prior's Pat. or "Paragon" Brass. 50%
 Olmstead's Tin and Zinc. 60%
 Olmstead's Brass and Copper. 50%
 Broughton's Zinc. 60%
 Broughton's Brass. 50%
 Steel, Draper & Williams. 50%

Openers, Can—
 Messenger's Comet. 50 doz \$3.00, 25%
 American. 50 gross \$2.75@3.00
 Duplex. 50 doz 25¢, 15¢@20%
 Lyman's. 50 doz \$3.75, 20%
 No. 4, French. 50 doz \$2.25, 55¢@60%
 No. 5, Iron Handle. 50 gr \$8.00, 45¢@50%
 Eureka. 50 doz \$2.50, 10%
 Sardine Sissors. 50 doz \$2.75@3.00
 Star. 50 doz \$2.75
 Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50. 66@70%
 Excelsior, No. 1 \$2.50; No. 2, \$1.50. 40%
 World's Best. 50 gross, No. 1, \$12.00
 No. 2, \$24.00; No. 3, \$36.00. 50@10%
 Universal. 50 doz \$3.00. 55@55%
 Domestic. 50 doz \$2.00. 45%
 Champion. 50 doz \$2.00. 50%
 Moore's. 50 doz \$2.00. 70%

Packing, Steam—
 Rubber—
 Standard. 70@70@10%
 Extra. 60@60@25%
 N. Y. B. & P. Co., Standard. 50%
 N. Y. B. & P. Co., Empire. 60%
 N. Y. B. & P. Co., Salamander. 25%
 Jenkins' Standard. 50 doz \$25@25@5%
 Miscellaneous—
 American Packing. 10¢@11¢ D
 Russia Packing. 14¢ D
 Italian Packing. 13¢@14¢ D
 Cotton Packing. 15¢@17¢ D
 Japs. 7¢@8¢ D

Pails—
 Creamery—
 S. S. & Co., 18-qt., \$7.00; 20-qt., \$7.25
 or doz. 50

Galvanized—
 10 12 14
 Hill's Light Weight. 5 doz. \$2.75 3.00 3.25
 Hill's Heavy Weight. 5 doz. 3.00 3.25 3.75
 Helwig's. 2.50 2.75 3.00
 Sidney Shepard & Co. 2.50 2.75 3.00
 Iron Clad. 2.50 2.75 3.00
 Fire Buckets. 2.75 3.25 3.50
 Buckets—See Well Buckets.

Indurated Fiber Ware—25%
 Star Falls, 12 qt. 50 doz \$4.20
 Mills, 14 qt. 50 doz \$5.40
 Stable, 14 qt. 50 doz \$3.00
 Fire Pails, deep. 50 doz \$4.80
 Fire Pails, round bottom. 50 doz \$5.40

Standard Fiber Ware—
 Plain. Dec'd
 Water Pails, 12 qt. 50 doz \$3.15 3.75
 Dairy Pails, 14 qt. 50 doz. 3.75 4.25
 Fire Pails, No. 1, 12 qt. 50 doz 3.75 4.25
 Fire Pails, No. 2, 14 qt. 50 doz 4.50 6.00
 Horse Pails. 4.50
 Buggy Pails. 5.50
 Slop Jars (bal. trap). 7.50 8.50
 Chamber Pails, 14 qt. 6.00 7.00

Pans—
 Dripping—
 Small sizes. 50 doz \$5.40
 Large sizes. 50 doz \$5.40
 Silver & Co. (Covered). 40%
 Fry—
 Standard List:
 No. 1. 50 doz \$3.00 3.75 4.25 4.75 5.25
 No. 2. 50 doz 5 6 7 8
 No. 3. 50 doz \$6.00 7.00 8.00 9.00
 Polished, regular goods. 75@75@10%
 Acme Fry Pans. 66@5%

Dust—
 Steel Edge, No. 1. 50 doz \$1.75
 Roasting and Baking—
 Columbian, S. S. & Co.: Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each. 60@10%
 Paper and Cloth—
 Sand and Emery—
 List April 19, 1886. 50@10@50@10@10%
 Sibley's Emery and Crocus Cloth. 30%

Parers—
 Apple—
 Advance. 50 doz \$4.75
 Baldwin. 50 doz 5.25
 Bonanza. 14 qt. 50 doz 5.25
 Bonanza. each 5.00
 Daisy. 50 doz 4.00
 Danford. each 7.50
 Eclipse. 50 doz 4.25
 Eureka, 1888. each 16.00
 Family Bay State. 50 doz 12.00
 Favorite. 50 doz 5.00
 Gold Medal. 50 doz 4.00
 Ideal. 50 doz 4.00
 Improved Bay State. 50 doz \$7.00@30.00
 Little Star. 50 doz 4.50
 Monarch. 50 doz 13.50
 New Lightning. 50 doz 5.50
 Orlo. 50 doz 4.00
 Penn. 50 doz 4.00
 Perfection. 50 doz 4.00
 Pomona. 50 doz 4.00
 Rocking Table. 50 doz 6.00
 Turn Table. 50 doz 4.50
 Victor. 50 doz 13.50
 Waverly. 50 doz 4.00
 White Mountain. 50 doz 4.00
 72. 50 doz 4.25
 78. 50 doz 7.00

Potato—
 White Mountain. 50 doz \$4.50
 Antrim Combination. 50 doz \$5.50
 Hoosier. 50 doz \$13.50
 Saratoga. 50 doz \$5.50
 Pencils—
 Faber's Carpenters'. high list 50%
 Faber's Round Gilt. 50 gr \$5.25
 Dixon's Lead. 50 gr \$4.50
 Dixon's Lumber. 50 gr \$6.75
 Dixon's Carpenters'. 10%

Pencils, Soapstone—
 See Crayons.
 Pickers, Fruit—
 Prize Fruit Pickers. 50%
 Picks—
 Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00. 60@10@60@10@10%
 Picture Nails—
 See Nails, Picture.
 Pinking Irons—
 See Irons, Pinking.
 Pins—
 Bow—
 Humason, Beckley & Co.'s. 60@10%
 Sargent & Co.'s, \$17 and \$18. 60@10%
 Peck, Stow & W. Co. 50@10@50@10@25%

Curtain—
 Silvered Glass. net
 White Enamel. net
 Escutcheon—
 Iron, list Nov. 11, 1885. 50@10@50@10@25%
 Brass. 60@60@25%

Pipe, Wrought Iron—
 List April 13, 1893.
 1 1/2 and under, Plain. 57@10@10%
 1 1/2 and under, Galv. 62@10@10%
 1 1/2 and over, Plain. 67@10@10%
 1 1/2 and over, Galv. 67@10@10%
 Boiler Tubes, list Oct. 24, 1892. 65@10%
 Casing, list Nov. 16, 1892. 52@10%
 Insulated Joints Casing, list Nov. 16, 1892. 60@60@2%
 Steel Boiler Tubes. 27@45%
 Cold Drawn Seamless Steel Tubing. 50%

Planes and Plane Irons—
 Wood Planes—
 Molding. 40@40@10%
 Bench, First quality. 45@45@10%
 Bench, Second quality. 50@60@10%
 Bailey's (Stanley R. & L. Co.) 50@10%
 Or Planes—
 Bailey's (Stanley R. & L. Co.) 50@10%
 Miscellaneous Planes (Stanley R. & L. Co.) 25@10%
 Steers' Iron Planes. 50@50@5%
 Meriden Mfg. Iron Co.'s. 50@50@5%
 Davis' Iron Planes. 50@50@5%
 Birmingham Plane Co. 20@20@10%
 Chaplin's Iron Planes. 50@50@5%
 Sargent's. 50@50@10%
 Standard Tool Co. 50@50@5%

Plane Irons—
 Butcher's. \$5.00@5.25 to 6
 Buck Bros. 50%

Auburn Thistle. 30@10@30@10@10%
 Ohio. 30@10@30@10@10%
 Sandusky. 30@10@30@10@10%
 L. & I. J. White. 30@10@30@10@10%
 Stanley R. & L. Co. 30@10@30@10@10%

Plates—
 Fellow. 30@10@30@10@10%

Pliers and Nippers—
 Button's Patent. 60%
 Halls' No. 2, 5 in., \$18.50; No. 4, 7 in. \$21.00 50 doz
 Humason & Beckley Mfg. Co. 50@50@10%
 Lindsay's Giant. 33@4%
 Gas Pliers. 60%
 Gas Pliers, Custer's Nickel Plated. 60@2%
 Eureka Pliers and Nippers. 40%
 Russell's Parallel. 50%
 P. S. & W. Cast Steel. 50%
 P. S. & W. Tinner's Cutting Nippers. add 6%
 Carey's Pat. Wire Cutters. 20%
 Morrill's Parallel, 50 doz, \$12.00. 30@25%
 Cronk's 8 in., \$15.00. 10 in. 30%
 Cronk's Butto. Pattern. 60%
 Cronk's Carrier Pliers. 60@60@25%

Plumbs and Levels—
 Regular list. 75@10@75@10@5%
 Stanley's Duplex. 30@10%
 Stanley's Handy. 30@10%
 Disston's. 50%
 Cook's. 40@10%
 Pocket Levels. 70@10@70@10@10%
 Davis Iron Levels. 30%
 Davis Inclometers. 10@10%

Poachers, Egg—
 Buffalo Steam Egg Poachers, 50 doz, No. 1, \$6.00; No. 2, \$9.00. 33@4%
 Silver & Co., 6-Ring, 50 doz, \$4.00; 2-Ring. 33@4%

Pokes, Animal—
 Bishop & I. X. L. 50 doz \$5.00
 Bishop's Monarch. 50 doz \$4.50
 Bishop's Pioneer. 50 doz \$4.00
 Bishop's American. 50 doz \$3.00
 Eagle, Double Stale. 50 doz \$5.75
 Eagle, Single Stale. 50 doz \$5.75
 Buckeye, Single Stale. 50 doz \$5.75
 Bolding. 50 doz \$5.00
 Metallic Horse Poke. 50 doz, \$6.00

Police Goods—
 R. I. Tool Co., Handcuffs, \$15.00 50 doz 10%
 R. I. Tool Co., Leg Irons, \$25.00 50 doz 15%
 Towler's. 33@4%
 Daley's Improved Handcuffs, 2 Hands, Polished, 50 doz, \$48.00; Nickle'd, \$57.00; 3 hands, Polished, 50 doz, \$72.00; Nickle'd, \$84.00. 33@4%
 J. P. Lovell's Police Goods. 33@4%

Polish—
 Metal—
 Prestoline. 50%
 Prestoline Paste. 33@4%
 Gaston's Silver Compound. 33@4%
 Stove—
 Joseph Dixon's. 50 gr, \$6.00, 10%
 Gem. 50 gr, \$4.50, 10%
 Gold Medal. 50 gr, \$6.00, 25%
 Lustr. 50 gr, \$4.75
 Ruby. 50 gr, \$3.75
 Rising Sun, 6 gro lots. 50 gr \$5.64
 Dixon's Plumbago. 50 gr \$5.64
 Boynton's No. 100 Day. 50 gr \$15.00
 Parlor Pride Stove Emery. 50 gr \$15.00
 Yates' Liquid, 2 8 5 10 gal
 \$ gal. \$3.80 .70 .50 .50
 Yates Standard Paste Polish, 10 m cans, 10 m 12 1/2

Jet Black. 50 gr \$2.50
 Japanese. 50 gr \$2.50
 Fireside. 50 gr \$2.50
 Diamond O. K. Enamel. 50 gr \$19.00
 Bonnell's Liquid Stove Polish. 50 gr \$9.00
 Bonnell's Paste Stove Polish. 50 gr \$9.00
 Black Eagle Benzine Paste, 5 and 10 m cans. 12@4%
 Black Jack Water Paste, 5 and 10 m cans. 12@4%
 Nickel Plate Paste. 50 gr \$6.00
 Crown Paste. 50 gr \$7.50
 Crown Paste in 5 and 10 m pails. 50 gr \$7.50
 Black Flag. 50 gr \$7.50
 Black Flag, 5 and 10 m pails. 50 gr \$7.50
 Black Flag, liquid, in bottles. 50 gr \$8.00
 Diamond Rock Nickel Cleaner. 50 gr \$10.50

Raven Liquid, 6 oz. bottles. 50 gr \$8.00
 Raven Liquid, 8 oz. bottles. 50 gr \$9.00
 Raven Water Polish, large boxes. 50 gr \$7.25
 Raven Paste in 5 lb. pails (cases of 6 pails). 50 gr \$10.00
 Poppers, Corn—
 Round or Square, 1 qt. 50 doz \$1.00; gr \$3.00
 1 1/2 qt. 50 doz \$1.00; gr \$3.00
 2 qt. 50 doz \$1.50; gr \$4.00

Post Hole and Tree Augers and Diggers—
 See Diggers, Post Hole, &c.
 Potato Parers—
 See Parers, Potato.
 Pots—
 Glue—
 Tinned. 40@10@40@10@25%
 Enamelled. 40@10@40@10@25%
 Family, Howard's. 40@10@40@10@25%
 Family, L. F. C.'s "Handy". 40@10@40@10@25%

Powder—
 In Canisters—
 Fine Sporting, 1 m each. 0.90
 Duck, 1 m each. .60
 Rifle, 1 m each. .30
 Rifle, 1/2 m each. .18
 In Kegs—
 Rifle, 25-m kegs. \$3.50
 Rifle, 12 1/2-m kegs. 2.00
 Rifle, 6 1/2-m kegs. 1.15
 Duck, 25-m kegs. 11.00
 Duck, 12 1/2-m kegs. 5.75
 Duck, 6 1/2-m kegs. 3.00

Presses—
 Fruit and Jelly—
 Enterprise Mfg. Co. 25%
 Benis. 50 doz \$3.50
 Shepard's Queen City. 40%
 Silver & Co. 50 doz \$3.75
 Pruning Hooks and Shears—See Shears.

Whips									
American Whip Co.	Length.	4 1/4	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
X. L. Whalbone Driving	...	\$18.00	20.00	22.00	24.00	27.00	30.00	33.00	36.00
Bureka, Two-thirds Whalbone	15.00	16.50	18.00	20.00	...	...
Ball Bone, Half-length Whalbone
American Standard	...	8.00	8.50	9.00	11.00	12.00	13.00	15.00	...
True Grip, Raw Hide	...	6.00	6.00	6.50	7.00	7.50	8.00	15.00	16.50
New Name, Stocked Java, Black and Wine Colors	6.00	...	...	...	...
Americus, 33 Pen Whip	6.00	...	...	...	...
Gents' Light Driving No. 111	6.00	...	...	...	...
Gents' Light Driving No. 106	5.00	...	...	...	...
Hand-made Stocked Java No. 108	8.75	4.00	...	...	...
A large variety of cheaper grades	50¢@85¢
Team Whips	22.00@27.50
Toy Whips	2.50@3.50
Hardware Assortment, 10/American, 75 Whips for \$50.00.

Wire and Wire Goods—Iron—

Market,		Stone,		Dr. and Ann'd,		Extra 10%	
Br. & Ann. Nos. 0 to 18.	75¢@10¢	Br. & Ann. Nos. 0 to 18.	80¢	Br. & Ann. Nos. 0 to 18.	80¢	Br. & Ann. Nos. 0 to 18.	80¢
Cap'd, Nos. 0 to 18.	75¢@10¢	Cap'd, Nos. 0 to 18.	80¢	Cap'd, Nos. 0 to 18.	80¢	Cap'd, Nos. 0 to 18.	80¢
Gal'd, Nos. 0 to 18.	70¢@10¢	Gal'd, Nos. 0 to 18.	80¢	Gal'd, Nos. 0 to 18.	80¢	Gal'd, Nos. 0 to 18.	80¢
Tin'd, Tin'd list, Nos. 0 to 18.	70¢@10¢	Tin'd, Tin'd list, Nos. 0 to 18.	80¢	Tin'd, Tin'd list, Nos. 0 to 18.	80¢	Tin'd, Tin'd list, Nos. 0 to 18.	80¢

Ossawan Mills, Brass and Copper on Spools.	60¢@10¢
Tate's Spooled, Tin'd & Annealed.	60¢@10¢
Tate's Spooled Cop. and Brass	60¢@10¢
Cast Steel Wire	60¢@10¢
Stub's Steel Wire	60¢@10¢
Steel Music Wire, 12 to 80, imported.	60¢@10¢
Wire Clothes Line, see Lines	60¢@10¢
Wire Picture Cord, see Cord.	60¢@10¢
Bright Wire Goods—	
Standard list.	85¢@85¢@10¢
Wire Cloth and Netting—	
Painted Screen Cloth 100 ft.	\$1.75@2.00
Galvanized Wire Netting.	75¢@75¢@10¢

Wire Barb—	See Trade Report.
Wire Rope—See Rope, Wire.	
Wrenches—	
American Adjustable	40¢
Baxter's Adjustable "S"	40¢@10¢@50¢
Coe's Genuine	50¢@60¢@10¢
Coe's "Mechanics"	50¢@10¢@3¢
Girard Standard	65¢@10¢@70¢
Lamson & Sessions' Engineers	60¢@10¢
Lamson & Sessions' Standard	70¢@10¢
Girard Agricultural	75¢@10¢@80¢
Lamson & Sessions' Agric'l.	75¢@10¢@80¢
W. & B. Diamond	

Bemis & Call's:	
Pat. Combination Bright	40¢@55¢
Pat. Combination Black	40¢@10¢
Merrick's Pattern	30¢@10¢
Brigg's Pattern	30¢@10¢
Cylinder or Gas Pipe	45¢@25¢
No. 8 Pipe	50¢@10¢
Allen's Pocket (Bright)	35¢@10¢
The Favorite Pocket	40¢@10¢
Webster's Pat. Combination	35¢@10¢
Boardman's	30¢@10¢
Always Ready	35¢@10¢
Donohue's Engineer	30¢@10¢
Eagle	50¢@10¢
Acme, Bright	40¢@10¢
Acme, Nickle	40¢@10¢
Hercules	70¢@70¢@55¢
Walker's	55¢@25¢
Diamond Steel	55¢@25¢
Cincinnati Brace Wrenches	25¢@10¢
Taft's Vise Wrench	55¢@10¢@75¢

Wringers, Clothes—	
Am. Wringer Co.'s list, July 1, '93.	25¢ cash
Colby Wringer Co.'s list, Sept. 1, '91.	25¢ cash
Lovell Mfg. Co.'s list, July 1, 1892.	25¢ cash
Peoples Mfg. Co.'s list, Feb. 1, 1892.	25¢ cash
National Wringer & Mfg. Co., list June 1, 1892.	25¢ cash
Wrought Goods—	
Staples, Hooks, &c., list March 17, 1893.	85¢@10¢@85¢@1

Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable Oils—

Linseed, City, raw, per gal.	45
Linseed, City, boiled	45
Linseed, Western, raw	44
Lard, City, Extra Winter	87
Lard, City, Prime	85
Lard, City, No. 1	85
Lard, City, No. 2	85
Lard, Western, prime	85
Cotton-seed, Crude, prime	37
Cotton-seed, Crude, off grades	34
Cotton-seed, Summer Yellow, prime	42
Cotton-seed, Summer Yellow, off grades	40
Sperm, Crude	75
Sperm, Natural Spring	79
Sperm, Bleached Spring	84
Sperm, Natural Winter	85
Sperm, Bleached Winter	89
Whale, Crude	55
Whale, Natural Winter	55
Whale, Bleached Winter	58
Whale, Extra Bleached	59
Sea Elephant, Bleached	55
Winter	35
Menhaden, Crude, Sound	38
Menhaden, Crude, Southern	38
Menhaden, Light Pressed	38
Menhaden, Bleached W'ter	43
Menhaden, Extra Bleached	46
Tallow, City, prime	60
Tallow, Western, prime	55
Cocunut, Ceylon	54
Cocunut, Ceylon	54
Cod, Domestic	38
Cod, Foreign	42
Red Elaine	44
Red Saponified	54
Bank	37
Strails	68
Olive, Italian, bbls.	60
Neatfoot, prime	75
Palm, prime, Lagos	74

Mineral Oils—	
Black, 29 gravity, 25 @ 30 cold test	7 @ 7 1/2
Black, 29 gravity, 15 cold test	7 1/2 @ 8
Black, 29 gravity, summer	6 @ 6 1/2
Cylinder, light, filtered	14 @ 16

Cylinder, dark, filtered	10 @ 13
Paraffine, 23 1/2 @ 24 gravity	11 @ 12
Paraffine, 25 gravity	10 @ 11
Paraffine, 28 gravity	7 1/2 @ 8
Paraffine, red	5 1/2 @ 10 1/2

Paints and Colors—

Barytes, Foreign, 1 ton	\$22.00 @ 24.00
Barytes, Amer. doated	\$29.00 @ 32.00
Barytes, Amer. No. 1	\$16.00 @ 18.00
Barytes, Amer. No. 2	\$13.00 @ 15.00
Barytes, Amer. No. 3	\$11.00 @ 12.00
Blue, Celestial	8 @ 8
Blue, Chinese	25 @ 40
Blue, Prussian	8 @ 25
Blue, Ultramarine	8 @ 25
Brown, Spanish	3 1/2 @ 1
Brown, Vandyke, Amer.	3 @ 3 1/2
Brown, Vandyke, English	8 @ 8
Carmine, No. 40, in bulk	2.75 @
Carmine, No. 40, in boxes	2.85 @
Carmine, No. 40, in ounce bottles	3.75 @
Chalk, in bulk	1.75 @ 2.00
Chalk, in bbls. 100 lb.	33 @ 40
China Clay, English	13 @ 18.00
Cobalt Oxide, prep'd	8.00 @ 11.00
Cobalt Oxide, black	1.00 @
Green, Paris, in bulk	10 @ 10 1/2
Green, Paris, 170 @ 175 lb.	10 @ 10 1/2
Green, Paris, small pack	12 @ 11
Green, Chrome, ordinary	6 @ 12
Green, Chrome, pure	22 @ 25
Lead, Eng., B.B. white	8 1/2 @ 10
Lead, Ann. White, dry or in oil	7 @ 7 1/2
Kegs, lots less than 500 lb.	6 1/2 @ 6 3/4
Kegs, lots 500 lb. to 5 tons	6 3/4 @ 6 1/2
Kegs, lots 5 tons to 12 tons	6 1/2 @ 6 1/4
Kegs, lots 12 tons and over	6 1/4 @ 6 1/2
Lead, White, in oil, 25 lb tin	1 @ 1 1/2
Lead, White, in oil, 12 1/2 lb tin	1 @ 1 1/2
Lead, White, in oil, 1 to 5 lb as sorted tins, add to keg price.	1 @ 2 1/2
Lead, Red, bbls. and 1/2 bbls.	6 @ 7
Lead, Red, kegs	6 1/2 @ 7 1/4
Litharge, kegs	6 1/2 @ 7 1/4
Litharge, bbls. and 1/2 bbls.	6 @ 7

TERMS, &c.—Lead and Litharge.—On lots of 500 lb or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle	1.35 @ 1 1/2
Ocher, French Washed	1 1/2 @ 2 1/2
Ocher, German Washed	1 1/2 @ 3
Ocher, American	1 1/2 @ 1 1/2
Orange Mineral, English	8 1/2 @ 9
Orange Mineral, French	10 @ 10 1/2
Orange Mineral, German	8 1/2 @ 9
Orange Mineral, American	8 1/2 @ 9
Paris White, English Chloride	1.00 @ 1.15
Paris White, American	65 @ 75
Red, Indian, English	5 1/2 @ 7
Red, Indian, American	2 @ 6 1/2
Red, Turkey	9 @ 14
Red, Tuscan	9 @ 11
Red, Venetian, American	1.00 @ 1.10
Red, Venetian, English	1.20 @ 1.35
Sienna, Italian, Burnt and	4 @ 5
Powd. " "	1 1/2 @ 3 1/2
Sienna, Ital., Burnt Lumps	4 1/2 @ 5 1/2
Sienna, Ital., Raw, Powd.	1 1/2 @ 3 1/2
Sienna, Ital., Raw, Lumps	1 1/2 @ 3 1/2
Sienna, American, Raw	1 1/2 @ 3 1/2
Sienna, American, Burnt and	1 1/2 @ 3 1/2
Powdered	1 1/2 @ 1 1/2
Talc, French	3 1/2 @ 4
Talc, American	1 1/2 @ 1 1/2
Terra Alba, Fr'ch. 100 lb	85 @ 1.25
Terra Alba, English	70 @ 80
Terra Alba, American No. 1	65 @ 75
Terra Alba, American No. 2	45 @ 60
Umber, Turkey, Burnt and	3 1/2 @ 4
Powdered	3 1/2 @ 4
Umber, Turkey, R'w Lumps	2 1/2 @ 3 1/2
Umber, Turkey, But. Amer.	1 1/2 @ 1 1/2
Umber, Turkey, R'w Amer.	1 1/2 @ 1 1/2
Yellow, Chrome	10 @ 25
Vermillion, American Lead	11 1/2 @ 12
Vermillion, Quicksilver, bulk	57 @
Vermillion, Quicksilver, bags	58 @
Vermillion, Quicksilver sm'r	65 @
Verdigris, English Import	82 @ 90
Vermillion, Initiation, Eng.	8 @ 35
Vermillion, Trieste	90 @ 92 1/2
Vermillion, Chinese	92 1/2 @ 95
Whiting Common, 100 lb	37 1/2 @ 42 1/2
Whiting Gliders	45 @ 55

Zinc, American, dry	4 @ 4 1/2
Zinc, French, Red Seal	7 1/2 @
Zinc, French, Green Seal	9 @
Zinc, French, V. M. X.	7 @
Zinc, Antwerp, Red Seal	7 1/2 @
Zinc, Antwerp, Green Seal	7 1/2 @
Zinc, German, L. Z. O.	6 1/2 @ 7 1/2
Zinc, V. M. in Poppy Oil, G.	10 1/2 @ 11 1/2
Seal, lots of 1 ton and over	10 1/2 @ 11 1/2
lots less than one ton	11 @ 11 1/2
Zinc, V. M. in Poppy Oil, Red Seal	10 1/2 @ 11 1/2
lots of 1 ton and over	10 @ 10 1/2
lots of less than 1 ton	10 1/2 @ 10 1/2
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1 1/2 %; 25 bbls., 2 %; 50 bbls., 4 %. No discount allowed on less than bbl. lots.	

Colors in Oil—	
Black, Drop, Frankfurt	25 @ 30
Black, Drop, English	12 @ 15
Black, Drop, Domestic	7 @ 10
Black, Lampblack, Best	20 @ 25
Black, Lampblack, Common	7 @ 18
Black, Ivory	7 @ 18
Blue, Chinese	35 @ 40
Blue, Prussian	20 @ 45
Blue, Ultramarine	12 @ 18
Brown, Vandyke	7 @ 12
Green, Chrome	8 @ 18
Green, Paris	16 @ 18 1/2
Sienna, Raw	7 @ 14
Sienna, Burnt	7 @ 14
Umber, Raw	7 @ 10
Umber, Burnt	7 @ 10

Putty—	
In barrels and 1/2 bbls.	.01 1/2 @ .01 1/2
In tubs	.01 1/2 @ .01 1/2
In tin cans	.01 1/2 @ .02 1/2
In bladders	.01 1/2 @ .02 1/2

Spirits Turpentine—	
In regular bbls.	29 1/2 @
In machine bbls.	30 @

Glue—	
Low Grade	8 @ 10
Cabinet	12 @ 14
Medium White	15 @ 16
Extra White	17 @ 20
French	10 @ 20
English	10 @ 15
Irish	12 @ 15

THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

RATES OF SUBSCRIPTION: INCLUDING POSTAGE.

UNITED STATES AND BRITISH AMERICA.	
Weekly Edition, Issued every THURSDAY morning.	\$4.50 a year.
Semi-Monthly Edition, First and Third THURSDAYS of every month.	2.30 "
Monthly Edition First THURSDAY of every month.	1.15 "

ALL OTHER COUNTRIES.

Weekly Edition: \$5.00=£1=25 francs=20 marks=11 florins=6 roubles (coin)=25 lire=20 pesetas.	
Semi-Monthly Edition: \$2.50=£1=12 1/2 francs=10 marks=6 florins=3 roubles (coin)=12 1/2 lire=10 pesetas.	
Monthly Edition: \$1.25=£1/2=6 1/4 francs=5 marks=3 florins=1 1/2 roubles (coin)=6 1/4 lire=5 pesetas.	

RATES OF ADVERTISING: ONE SQUARE (12 LINES, ONE INCH).

ONE INSERTION	\$2.00
ONE MONTH,	7.50
THREE MONTHS,	17.50

SIX MONTHS,	\$30.00
ONE YEAR,	50.00

Rates for larger spaces quoted on application.

New York (Main Office),	96-102 Reade Street,	DAVID WILLIAMS, Publisher,
Philadelphia,	220 South Fourth Street,	THOMAS HOBSON, Manager,
Pittsburgh,	Room 509, Hamilton Building.	ROBERT A. WALKER, Manager,
Chicago,	59 Dearborn Street, cor. Randolph,	J. K. HANES, Business Manager,
Cincinnati,	Rooms 22-24 Pickering Building,	Geo. W. COPE, Resident Asso. Ed.
St. Louis,	Bank of Commerce Building,	HENRY SMITH, Manager,
Boston,	146 Franklin Street,	H. H. ROBERTS, Manager,
Cleveland,	312 The Cuyahoga,	WALTER C. ENGLISH, Manager,
		EZRA S. ADAMS, Manager.

BRITISH AGENCY: Office of The Ironmonger, 42 Cannon St., London.

AUSTRALIAN OFFICES: Melbourne, 231 Elizabeth St.; Sydney, 234 Clarence St.

Remittances should be made by draft, payable to the order of DAVID WILLIAMS, on any banking house in the United States or Europe, or by P. O. Money Order on New York. When these cannot be obtained, postage stamps of any country will be received. Newsdealers or Booksellers in any part of the world may obtain The Iron Age through The American News Company, New York, U. S. A. The International News Company, New York, U. S. A. and London, England; or The San Francisco News Company, San Francisco, Cal., U. S. A.

Entered at the Post Office, New York, as Second-Class Matter.

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

GoogleTM books

<https://books.google.com>

